BEFERENCE COPY

DO NOT REMOVE FROM THIS ROOM

Volume 4 Number 19

ptember 17, 1985

Laser Magic:

 The Little Engine That Could

Graphics Gymnastics

Editor's Choices: The Best Printers From \$200-\$7,000

**Beyond Lasers:** Startling New Technologies

IBM vs. Japan

Suddenly They're Affordable:

Compact Color

- Awesome Speed
- · Letter Quality





# THE WORLD IS FULL OF EXPERTS.

#### SMD AND SCSI PERFORMANCE ON A SINGLE BOARD . . .



SMD/SCSi Single Board Controller

84 mb 166 mb 167 mb 167

#### FROM THE WORLD OF INDUSTRY STANDARDS



And introducing the NMS Single Board SMD/SCSI PC Controllar for all IBM, compatible and TI applications. Provided with a two year warranty.

#### ... NMS PROVIDES

#### ► WE MEET YOUR NEEDS

For your individual PC or as the high performance file server within your local area network; you get the disk and tape NMS 8000A series multifunction controller with SMD disk technology that provides selections of 84mb, 168mb, 335mb, 474mb and more because you can combine any combination of two disk capacities.

#### ► PERFORMANCE

Average access times of 15 milliseconds and disk data rates of up 2mb/sec... There are none faster nor more reliable than NMS controllers and memory systems.

## ► NETWORK SELECTION MADE EASY Choose the IBM PC Network, Novell, Orchid, 3-Com or host of others . . . Compatability is

3-Com or host of others . . . Compatability is virtually assured with on board switch selectable DMA channels, port addressing, and versatile software for all DOS applications . . . And other popular applications tool

#### ► HALF-INCH OR QUARTER INCH TAPE BACK UP

Choose our 9000 series 1/2-inch, 1600 BPI ANSI IBM format tape system or industry standard PC.25 60mb 1/4-inch tape system. Easy to use in file-by-file or image back up modes.

#### ► LASER OPTICAL DISK

CONFIGURATIONS ARE OPTIONAL Archival purposes with 5-1/4 inch form factor, or 12 inch media with storage of up to 1,000 megabytes per platter.

#### ► CALL US

All products are provided with NMS standard one year RTV warranty and optional Nationwide Field Service. 8000A controller provided with NMS standard RTV two year warranty.

\*\*PC.25 is a trademark of National Memory Systems Corp.
\*\*8000A is a trademark of National Memory Systems Corp.

PHONE 415-443-1669

TWX 9103866006 TELEX 821692 NMS UD National Memory Systems

355 Earhart Way Livermore, CA 94550 (415) 443-1669



# Two-for-one special.

Tired of the perplexing decision about which desk-top computer to buy?

We don't blame you. Many people are familiar with the sophistication, power and advanced technology of the Macintosh. Others admire the IBM PC and its library of almost 10.000 software programs.

So which computer should you buy?

Well, now MacCharlie from Dayna Communications gives you an easy answer. Because with MacCharlie, your MacIntosh becomes compatible with IBM PC software—and you benefit from the best of both worlds.

MacCharlie actually enhances IBM PC software. Your Macintosh menu bar and window sizing are still active with the mouse. So now you have use of options like the clipboard, calculator and notepad with IBM PC software.

And through MacCharlie, you can link Macintons to 18th serial networks and mainframes. Data files are also transferable from Macintosh to 18th and vice versa. Even if you have already taken the plunge into the IBM PC world, you now have the means to advance to Macintosh and still keep your software library intact.

So have your Macintosh and IBM PC software too, with MacCharlie, and enjoy the best of both worlds.

## Maccharlie by Dayna Communications

For more information, call Operator 17 toll-free, 1-800-531-0600. (In Utah, call 801-531-0600.)

MacCharlie is a product of Dayna Communications, 50 S. Main, Salt Lake City, Utah 84144

## REE DATABASE

Inventory & A/R Applications
PROGRAMMABLE RELATIONAL
FULL VERSION NOT A DE MO

Continue to Time 
 Continue to Time

SPREADSHEET

basic for easy moontures.

Very on Provided (190K)

\* Sample Cherchook & Income Tax Applications

\* Humbers & Test may be placed anywhere on the

AND EXPERT SYSTEM

INFERENCE ENGINE Determina Multiple Problems

- Determina Multiple Problems

- Determina Multiple Soutema

- Macque Problems

- Logic Res of Multiple Souteman

- Logic Res of Multiple Souteman

- Supplied on Problems

- Multiple Souteman

- Multipl Accepts Unknown Input Source Code & Computed Version (192K) Written in Bellij for easy modifications

SUPERIOR IN SEVERAL AREAS SUPERIOR IN SEVERAL AREAS

The partners was the Warren's beginning to the Several Seve

NO STRINGS ATTACHED

You do not have to thuy environg size to use the system. We don't use as it may survived success for the cost of the costs. A marching! We developed the project so have for our own one. We do not sidely may program should see do not swin to be in the software surrising may program should see do not swin to be in the software surrising sources. We are given the program says as a poor of service is firmly good opticity. The 127 the covers the cost of their is deals and the specificially see was and interesting as we may not provide your formation.

PC-SIG DISKS 214,215,267, & 268 PPE POTOMAC PACIFIC ENGINEERING INC.

26. Copy the system from someone who aheady has one OR

For the surest most powers, action sond \$20 to cover 19 cents
at 4 0000 case for less man securité de montre copyring A Analysis on 8 SSDD data \$10 sates

Analysis on 8 SSDD data \$10 sates

Opinios USA and \$2 MD residents and 5°, tax

Altips 2 to 3 weeks for delivery Prease send the Delabase of Steel the Spreaduncer of Steel & P. Experi System of Steel to

......

Carristere Ze ....



CIRCULATION ASSISTANTS

POUNDER ....

EDITORIAL DIRECTOR

EDIT. PRODUCTION COORDINATOR

PUBLISHER

EDITOR Bill Machrone EXECUTIVE EDITIORS .. Barry Owen, Paul Somernon SPECIAL PROJECTS EDITOR...
TECHNICAL EDITOR
ASSISTANT MANAGING EDITORS
MANAGER, COPY EDIT
ASSOCIATE EDITORS. John Dickimon Craig L. Stark Latea Simone, Gus Vendino Janda Louk
Jensefer de Jong, Lisa Kleinenan, Barbaro Krannoff,
Stephanie Stallings
Don Kennody SENIOR EDITOR, PC NEWS Janet Lewis Michael O'Cone Paul Ross ASSISTANT EDITORS

Jeff Weiner

Frait BOH

Chaptes Bermant, Gendd Carney, Victoria Darcoff, Virginia Dudek,
Michael Dipredie, Cheryl Goldberg, James Langdelli, Jane Mintser,
David Oleopjek, Ann Ovodow

Greg Patrick

Devid Blace, Christina Olang, Paul M. Stafford EDITORIAL ASSISTANTS BUSINESS MANAGER Devid Baker, Christian Chang, Paul M. Stafford
Ink Katted
M. Stephane Rocks, All Revended
M. Stephane Rocks, All Revended
Rocked Antenn, Frank J. Derfar, Jr., John Dickinson,
Richard Antenn, Frank J. Derfar, Jr., John Dickinson,
Glom Hart, Serve Hickaner, Stephen Manex, Fear Notion, Martin Porter,
Winn L. Rocks, Craig Stateon, Javed Taylor, Robbs Webster
Seatom N. Stown. PROOFREADERS 

ASSISTANT to the PUBLISHER . DESIGN DIRECTOR. Peter J. Blank Mary Zirk, Gerard Kunkel Mariano Nicieza

ASSISTANT ART DIRECTORS Bissa Goodheart, Sam Whitford

Natalie Chu, Monsque Cubeccotti, Sasan McGuire LAYOUT ARTISTS HERE BY BELLATIONS MANAGER Jacobs Kersey SINGLE COPY SALES DIRECTOR Lon A. Hellevig Mickey Krueger, Robert Smahl

Eugene Duncan Ziff Davis Publishing Company, One Park Avenue, New York, NY 10016, (212) 503-5000 Robest Thomas Nicole Sandon, Randi Fox Rosemary Toylor ADVERTISING MANAGER ADVERTISING OFFICE ... AD PRODUCTION MANAGER ... AD. PRODUCTION ASSISTANTS SR. EDIT. PRODUCTION COORD

> ... Anthony Gold COMPUTER PUBLICATIONS DIVISION

PRESIDENT
VICE PRESIDENT, ENTIVELAL
VICE PRESIDENT, PRODUCTION
VICE PRESIDENT, PRODUCTION
VICE PRESIDENT, CIRCULATION SERVICES
VICE PRESIDENT, CIRCULATION SERVICES
VICE PRESIDENT, MARKETING SERVICES
VICE PRESIDENT
MARKETING MANAGER
RESTRESS MANAGER
RESTRESS MANAGER Kenneth H Koppel Josephan Lazarus Baird Davis
Herbert Stern
Abeus Mane Ivans
James Ramaley Ann Pollak Add Hugh Tietjen High Liegen Ronne Sonnenber Gary A. Gustafson

ZIFF-DAVIS PUBLISHING

JoAnne Sangirurdi Gray

nt Richard P. Friese Senior Vice President Philip Sine, Kenneth H. Koppel Vice Presidents Rosy Paris, William Phillips Tree Selwyn Taubroan Secretary Bertram Abrams

The basis of the b

#### YOUR DAYS OF BUYING **GRAPHICS TERMINALS** ARE OVER

Now there are two ways to use your PC to access popular mainframe graphics products like SAS/GRAPH\*. TELLAGRAPH\*, RS/1\*, DISSPLA\*, and PLOT-10". Joining our popular

SmarTerm 125 DEC' VT125 ReGIS graphics emulator, our NEW SmarTerm 4014 product gives you full Tektronix\* 4010/4014 plus DEC VT102 emulation. View the entire graphics image on the PC screen, or

use the powerful instant ZOOM feature to magnify a selected portion of the screen image to full Tektronix 1024 x 780 resolution.

Using Picture Playback, pictures drawn by the host can be saved, sent to other users, examined in detail using ZOOM mode, and printed or plotted offline. Like all SmarTerm emulators. SmarTerm 4014 includes powerful text and binary file transfer facilities. PDIP\* and XMODEM protocol support, and TTY mode to link you to popular time sharing services.

By the way, if you only need text terminal emulation, be sure to ask about our SmarTerm 220, SmarTerm 100, and SmarTerm 400 products.

Join the more than 25,000 "FIRST CLASS" people who use SmarTerm. Try it for 30 days with full refund privileges.

Available from Computerland, your local software dealer, or Persoft, Inc. - 2740 Ski Lane Mediton WI 53713 (606) 273-6000 - TELEX 759491

person

SMARTERM, WHAT **DO YOU DO WITH YOUR OBSOLETE TERMINAL?** 



IDEA CREDIT: Jill Roth of Chino, Californie. Send us your ideas for uses of obsolete terminals replaced by SmarTerm. The best ideas will be used in future eds. Write Persoft, Dept. MAILBOX, 2740 Ski Lane, Medison, WI 53713.



VOLUME 4 NUMBER 19 . SEPTEMBER 17, 1985

		ÞΞ	EE
n Stee	:=		.18
			18
m Table		=	1 20
m Will	FE	Contract of	2 80
	E	#=	100
		11-	180
o little	7 2	EE T	1 00

page 183

#### SPECIAL ISSUE



John Dickinson/If you're interested in getting your PC's output onto paper, then look no further than the pages of PC Magazine's second annual special printer issue. Since last year's comprehensive printer roundup, no fewer than 70 new and significantly upgraded machines have appeared on the scene: we've subjected one and all to PC Magazine's torture tests. We tested machines in every category and price range. from a simple \$249 dot-matrix printer to one \$7,995 laser machine with enough features to turn Buck Rogers green with envy. Combined with last year's extravaganza, this year's crop of reviews, conclusions, and comparative tables of test results gives PC Magazine's readers a complete buyer's guide to an unprecedented total of 120 printers.

G Q G G G G

For your perusal: PC Magazine's printer review team evaluates the latest, greatest, and most innovative new printers, listed for comparison from the least expensive to the highest priced.

#### 

Here's an easy-to-read listing of vital information such as speed, range of formatting features, sound level, and PC-compatibility. PC Magazine's information-packed printer charts put the facts at your fingertips when buying time is here.

#### COLUMNS/DEPARTMENTS

WHAT'S INSIDE An insider's guide to the making of PC Magazine.

PC NEWS . Four pages of up-to-the-minute news.

short features, and commentary.

FROM THE EDITOR'S SCREEN Printer Testing in Perspective .. 51 Bill Machrone/In last year's printer issue, PC Magazine reviewed 120 printers. This year, we present 70 new and improved machines.

LETTERS TO PC MAGAZINE ... 63 PC Magazine's readers from across the

country and around the world share their insights, comments, and questions. THE NORTON CHRONICLES

The Peter Printer Principle ..... 69 Peter Norton/What are the qualities you should look for in a printer? Price. compatibility, and features are not the whole story. Norton suggests that whatever your needs may be, one of your primary considerations should be cutting

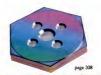
down on excess noise.

#### OUANTUM LEAP

An Important PostScript ...... 77 Ron Jeffries/With PostScript, a laser printer graphics language, you can output any page to virtually any printer in any format you choose.

#### COMPUTERS IN SOCIETY

The Micro Is the Message ...... 87 Stan Augarten/Taking a page from social commentator Marshall McLuhan, Augarten examines the idea that society's use of computers provides a perspective on the society itself.



#### Editor's Choice ...... 19-John Dickinson/PC Magazine's resident printer guru presents his picks of the printer market in each price range. Some of his

favorites are old standbys and some are relative newcomers to the scene, but this year's crop was so good that it was difficult to decide which to leave out.



#### MARKETING

Japanese Printers ..... Jared Taylor/Here's a look into the past, present, and future of Japan's influence in the PC printer market.

#### HARDWARE

Laser Printers John Dickinson/PC Magazine takes a look at the newest and hottest machine in print technology: the laser printer.

#### The Little Engine That Could ......210

Bill Harts/The Canon LBP-CX laser printer engine sits at the heart of nearly every laser printer on the market. What makes this little device so special?

#### 

Kaare Christian/In the race among printer technologies to establish hegemony, the new laser printers are winning out.

#### Electro-Optical Printers: Beyond the Cutting

Steve Rosenthal/The next wave of high-resolution PC printers might very well reach beyond laser technology. SOFTWARE

Printer Utilities ..... Alfred Poor/Unleash your printer's exotic potential.



#### PROGRAMMING

Getting Graphics to Speak ASCII... John Dickinson/PRSWAP.COM teaches noncompatible printers to

produce screen dumps of PC graphics. SPREADSHEET CLINIC ......251 Jared Taylor/Users pass along the fruits

of their spreadsheet experience. POWER USER ...

Charles Petzold/Helpful hints from readers for using PC's productively.

Paul	Sa	ne	rson	IPC	M

agazine's readers are their tips, short programs, and useful utilities.

PC BLUEBOOK ......270 A quick reference guide for PC owners.

PC TUTOR......293 Mark Zachmann/PC Magazine answers readers' technical and nontechnical questions. In this issue, PC Magazine helps fix bugs in DOS, tames stubborn subdirectories, and more.

#### PRODUCT INDEX ... Products in the pages of PC Magazine.

PC:MART......290

INDEX TO ADVERTISERS ..... 297

COMING UP PC Magazine ...... 299

Cover Photograph: Les Morsillo Typography Design: David Herbick Output: Printed with INSET software by APG

PC MAGAZINE • SEPTEMBER 17, 1985

## MAKE ROOM FOR A NEW MASTER





New DIAGRAM-MASTER™ helps you visually communicate complex processes and relationships such as, time schedules, product flow, reporting structures, and much more.



Organize your organization.

Watch your organization grow right on the screen as you respond to DIAGRAM-MASTER's easy-to-follow prompts. Labels and boxes are sized automatically.



Make your point

Display project schedules graphically, and give your audience "the big picture." Choose your time interval, name the activities, and insert up to three different types of bars for each activity

### Diagram-Master







Our Drawing Board gives you all the graphics power you need to create unique business diagrams, or to customize your organization and Ganticharts. Create your own Library of shapes or use ours.

Library of shapes, or use ours.
DIAGRAM-MASTER joins
forces with CHART-MASTER®
and SIGN-MASTER™—the most
widely used business graphics

software family—tomake quality presentations easy to create on any IBM or IBM-compatible personal computer. Find out how: Call us at (203)

222-1974 for the name of your nearest dealer.

Suggested Retail: \$345.00

## Decision Resources

Westport, CT 06880

## Lots of dollars.



## Lots of sense.



*\$*69.95

T hey've been doing it for years. Selling you accounting software module by module, till before you know it you've paidup to five thousand dollars for a complete system. That's a lot of dollars... which doesn't make good business sense. Now, there's a better alternative. Dac Easy

Now, there's a belief alternative. Duc Lasy Accounting, For only \$69.95, Dac Easy is a fully integrated accounting package offering instant access to General Ledge, Accounts Receivable, Accounts Payable, Inventory, Purchase Order, Billing and Forecasting, And Dac Easy has the flexibility to manage either product or service oriented businesses.

It's not just the price that makes Dac Easy better. Only Dac Easy saves three years of history in all files, making automatic forecasting easier and more accurate. Plus, you can generate any of 300 different reports for instant access to the exact information you need. Dac Easy is menu-driven for ease-of-use.

Dac Easy is menu-driven for ease-of-use, and comes with easy-to-understand documentation inside a handsome slipcase binder. It's also non-copy-protected. Listen to what experts are saying:

"Dac Easy Accounting is remarkable, amazing, revolutionary, sensational..." Computer Buyer's Guide & Handbook. September 1985

Find out for yourself why Dac Easy is the fastest selling accounting package in history. Compare Dac Easy's range of features against systems costing thousands more. You'll see how Dac Easy can save you lots of dollars. Which makes a lot of sens.

ARTIALLIST OF FEATURES
eneral Information
Henu driven
Password protection
He capacity limited only by disk space
Support contract available eneral Ledger
Unionited multi-level accounts
There was account history for CKT inquiry
Pencil and pen feature to correct mistakes
Unique budgeting routine
ORT transaction inquiry
Activity report, trial balance, financial statemen

Accounts Receivable
Open invoice or balance forward
Cusication aging report
Utilization number of customers
Flexible making labels and directories
Supports partial personnels disease changes
Three-year customer balancy for number of associous, and profiles
counts, and profiles

Automatic sales forecasting
 Accounts Payable
 Check printing with multiple invoices and cash avail restries
 Aging reports with seven customized columns

Aging reports with seven customized column
 Unlamited number of vendors
 Fessible mailing labels and directories
 Three year vendor history
 Unlamited allocations per invoice

methods

Powerlal physical inventory routines

Accepts any unit of measure

Three-year product history in units, dollars, cost, profits

Automatic loyecast of product sales

probles
- Automatic inercent of product sales
- Automatic pricing assignments
- Automatic pricing assignments
- Alert and activity reports with II sorts
- KIT shows on-handlon-order committed sales/cost
hams GRO
Parchase Order
- Investing and non-investing items

Inventory and non-inventory items
 Allows up to 99 lines per PD
 Per Izer discount in N
 PO, accepts green's discounts freight bases insurance
 PD, accepts back orders and returns
 Punchase journal
 Punchase journal

with intents

Prints sales journal

Allows return credit memo
Forecasting
Unique program that automatically lorecasts using yo
finese-vest histone.

Inventory item usage
 Forecast by same as last year, or % base from last year, or trend, or least square trend line analysis method

Easy - Accounting

To Order Call Toll Free

1-800-431-0800 Ask For Operator 292

For More Information Or In Texas Call 214-458-0038

 dac software, inc 4801 Spring Valley, Building 110-B, Dallas, TX 75244

Send in this coupon with your credit card number, money pounder or check for \$69.95 plus \$7.50 for postage and handling. In Texas, add 61/44 sales tax (\$4.28). Outside U.S., add \$17.30 for postage and handling. No C.O.D.

AMEX VISA MASTERCARD Expires

Account No.

Name

Company Name

Address \_\_\_\_\_\_ State \_\_\_\_\_ Zip \_

Signature — 30 Dar Noney Back Guarantee doc solware, mc provides a 30-day money back guarantee that all claims and features listed in this ad are tise.

Minimum Hardware Requirements: IBM (PC), PC, XT, or AT) or other compatibles. 128K memory, one 5½ DSDD floppy disk, 132 column printer compressed mode, 80X24 CKT, MS-DOS\*, PC DOS\* 2.0 or later.

Accounting

CIRCLE 148 ON READER SERVICE CARD

## HAUPPAL



to Fast Math, Your AT Will Get an A+. Right now, the 80287 math Co-

4MHz Which means there's room for improvement. That's why

for improvement. I nat a way
Hauppauge has developed the
unique 287 FAST/5—a module that gives your AT an
unmatched 5MHz capability. Speeding up your math
computations by 25%. Now that's an A+ performance! To insure easy installation, we've created a carrier mount for our 287 FAST/5. Just plug the module into your PC/AT's 80287 Numeric Coprocessor socket. No expan-

sion slot required.

87 CHIP ..... \$129

Our 8087 Math Coprocessor for the IBM PC, PC/XT and PC compatibles 87-2 CHIP \$229 8 MHz Math Coprocessor for

Compaq Desk-Pro and Olivetti PC's. 287 CHIP 80287 Math Coprocessor chip that runs at 4MHz in the IBM PC/AT 287 FAST/5 ..... \$249

Our 80287 Math Coprocessor enhancement module that boosts speed in the IBM PC/AT to 5MHz.

## Introducing Hauppauge's New Lotus Support

In addition to our 287 FAST/5, Hauppauge has recently developed a Lotus 1-2-3 support package that can accelerate

developed a Lotus 12-2 support package that can accelerate your calculations up to 30 times. The package? Our 8087 coprocessor chip and Recalc" software. Recalc links your Lotus 12-3 program to the fast math capability of our 8087 chip. By sending numeric operations to the 8087, computation time can be reduced from 60 seconds to as little as 2 seconds. And the more complex the calculation, the more time you save!

Affordability

We've raised the speed limit for Lotus 1-2-3 and lowered the cost of Recalc software. When you buy any of the Hauppauge Now Available! The 287 FAST/8 ......\$379 In addition to our 1-2-3 support, we're introducing our new 287 FAST/8-a module that gives your IBM PC/AT an unprecedented 8 MHz capability. Doubling the speed of your math calculations! (module pictured above)

Hauppauge's 287 FAST/5 and Lotus support package are teaching the IBM PC, PC/XT and PC/AT a thing or two about fast math. Learn more by calling us today—or contact your local computer dealer.

Hauppauge Computer Works 358 Veterans Memorial Highway, Suite MSI Commack, New York USA 11725 (516) 360-3827 Available from your local computer dealer

ertisise: Scali Communications, San Francisco

CIRCLE 119 ON READER SERVICE CARD

(Pronounced: "Ha-pop"



## **POPART**

wh

En

Cu

Ger

ani Cal

tap

1:

Name on card:

Q. What would you call a desktop software package that can Pop-Up Amything-prosednees, databases, or even DOS-over another application? What if it also offers a Pop-Up Standard Calculator and Financial/Statistical Calculator. Alarm Clock, Notepad, Clipboard, Calendar, Puls Pop/DOS and Pop-Up Voice to dial your phone automatically? What would you call a single package that does all this, is non-copy protected and selds for 369, 967 all this, is

A. Beautiful! New Pop-Up DeskSet from Bellsoft.
CRITICS AGREE:

"Bellsoft has taken the Sidekick idea a step further." Infoworld, 1/14/85

USERS AGREE:

"Much better than competition (know anyone who wants to buy a 'Sidekick?')" Ivan Myers, Cummins Engine Co.

"This is an Excellent Package. (Thanks)" James Bondurant, ComputerLand Corporate

New Pop-Up DeskSet includes Standard and Financial Calculators, Pop-Up Anything, PopDOS, Clipboard, Notepad, Calendar, Alarm Clock and Pop-Up Voice; \$69.95.

New Pop-Up DeskSet Plus includes all the above plus Pop-Up TeleComm, a telecommunications program; \$129.95.

CIRCLE 103 ON READER SERVICE CARD

System requirements IBM PC, XT, AL, 3270 PC, PCjc or compatible Phone dialer and telecommunications require a PC or XT and a Hayes compatible modern. Pop-Up, Pop-Ups, DeskSet are trademarks of Bellsoft, Inc. Sidelsick is a trademark of Borland International. ONLY DESKSET OFFERS ALL THESE FEATURES:
POP-UP\*\* DESKSET\*\* SIDENICK\*\*

ile running another	YES	No
tirely RAM-resident	YES	No
t-and-paste capability	YES	No
ts DOS commands while running other program	YES	No
iculator with printable on-screen e display	YES	No
DESKSET  vailable at leading software dealers. Or for limited time you may order direct by mail or phone. Call 1-800-44-POP-UP 1-800-447-6787). Or mail this coupon to elisoft, inc., 2820 Northup Way, tellerue. WA 9004.		
Accessed the following		

Card #:\_\_\_\_\_\_ Exp. date:\_\_\_\_\_ Signature:\_\_\_\_\_

BELLSOFT (206) 828-7282



umber one

IN HARD DISK STORAGE SYSTEMS **DESIGNED WITH** 

THE IBM PC IN MIND

10 MB KIT

889

PRICE

1-800-882-8311

20 MB AT KIT

PRICE 1199

#### EXTERNAL STORAGE

INTERDYNE \*799 CIPHER 25 MB TAPE 1995

AMPEX MEGASTORE 20 MB HARD DISK 25 MB TAPE 2295

TALLGRASS 25 MB HARD DISK 60 MB TAPE 2795

BERNOULLI 10 MB PC/XT/AT 11995 20 MB PC/XT/AT 2595 5 MB PC/XT/AT 11695

COMBINATION HARD DISK AND FLOPPY CONTROLLER 10 MB FH \*599 20 MB FH \*799

#### 10 MB EXTERNAL \$749 20 MB EXTERNAL. HARD DISK \$895

ITT EXTRA

STATEWIDE GOES NATIONWIDE On-site installation and maintenance for

FREE! MODEM ABOUT

FLOPPY DISKETTES DS/DD 95¢

1-800-882-8311



10 East 22nd Street, Lombard, IL 60148

INTERNAL STORAGE

1599 10 MB H/H RODIN COGITO SEAGATE

20 MB FOR AT 1699 30 MB FOR AT 1795 40 MB FOR AT 1929 67 MB FOR AT \*1895 86 MB FOR AT 12595 10 MB REMOVABLE DMA HARD DISK DRIVE '1195 INTERDYNE TAPE BACK-UP °549

130 WATT POWER SUPPLY 195 312-655-2266

DEALER PRICING AVAILABLE

## Isn't it about time you got your programs together?

While you run your business, your computer can simultaneously run Structured Systems Group's Six Accounting Packages ...

- Close your books for the month using SSG's General Ledger
- ✓ Apply payments against invoices using SSG's Accounts Receivable
  ✓ Post vouchers using SSG's
  - Accounts Payable
- ✓ Calculate and run payroll using SSG's Payroll
  - Let your sales people enter orders using SSG's Order Entry
  - using SSG's Order Entry

    Print a report of goods sold using
    SSG's Inventory

It all happens under the WindowMaster™ multitasking windowing system. Plus: You can run popular industry packages such as: Lotus 1-2-3,™ WordStar,™ dBase,™ and TopView™ application programs concurrently. Let your computer work for you.



#### Call Today (415) 268-1488





## Ven-Tel's Half Card<sup>™</sup> modem is in all the best computers. Here's why...

**ATST** 

сотрад

TANDY

Panasonic

TTT

Ven-Tel gives you lots of reasons to buy our Half Card " modern for your IBM PC or compatible. The Half Card™ is a complete system that lets you communicate with other PCs, mainframes, and databases effortlessly. It includes Crosstalk-XVI® software. It's reliable. It's got all of the features you want. And it's a good value.

#### Do You Own One of These Computers?

Chances are you do. And if vou're thinking of buying a modem, consider the Half Card \*\*. Because of its small size, the Half Card™ fits in more computers. including all of the models we've listed here. The Half Card\* is small, so it fits in short slots or long. That means you can save your long slots for other expan-

#### sion uses.

**Effortiess Communication** Each Half Card™comes with Crosstalk-XVI® communications software, by Microstuf. It's the easiest to use, whether you're a beginner or an old hand, and the most powerful. A full on-line help menu makes using Crosstalk® for the first time a snap. It can turn your PC Into a terminal on a mainframe computer with its power ful terminal emulation feature, it will even oper-

ate your PC when you're not there. You can call into an information service such as The Source or Dow Jones News Retrieval, or transfer flies and electronic mail, all at the touch of a button. The Half Card™ connects your computer to the world. Effortlessly.

#### More Modem for Your Money

When you buy the Half Card," you don't need anything else. The Half Card™ is a complete communications package that include a full-featured modern and the best known software on the market. Complete easy-to-understand instructions with full technical support on installation and use. And a very competitive price. The Half Card." with Crosstalk-XVI® software, retails for only \$549.

Ven-Tel has been making modems for 10 years. Our experience shows. Ven-Tel's

Half Card™ only has about 70 parts, compared to almost 300 on other modems. We reduced the pa by building the first LSI modern chip using advanced switched capacitor technology. What that means to you is greater reliability and lower power consumption, so you can load up your PC with expansion boards and not worry about heat or power problems. And we back the Half Card™ with a full

#### two-year warranty on parts and labor. You Can Buy the Half Card" Anywhere

You can get the Half Card " at Compute Land, Businessland, the Genra Group, Entré Computer Centers, Macy's Compute Stores and other fine dealers nationwide. Also from Ven-Tel: the 1200 Plus," an external modern and the PC Modern 1200," an IBM Internal with V.22 Inter national capability.

#### **Effortless Communication Den-Tellnc.** ◆Ven-Tellnc.

2342 Walsh Avenue Santa Clara, CA 95051 (408) 727-5721



Uses the industry standard "AT"

Talk III and integrated packages such

 On-board speaker and extra phone lack for easy switching from voice

to data mode. Selective tone or pulse dialing;

full or half duplex. Automatic answer on any ring. True ring or busy signal detection.

## What's Inside

Deep in the basement of One Park Avenue is the new PC Lab, where some of the most important behind-the-scenes work at PC Magazine is done, like testing 70 printers for this issue's special printer report.

everal of our readers may have been bemused by the sudden switch of nomenclature here at PC Magazine's offices, specifically, the changing of the Toy Shep to the PC Lab. story behind that. And since this special printer issue's had a great deal to do with it, it may be a good time to tell you about the switch.

First of all, one of the reasons behind the Toy Shop's name was it's resemblance to one of those old-fashioned shops that you picture presided over by a little old man in wire-rimmed glasses. It was full of interesting and exciting hings, all stored in such a manner that the proprietor—in this case, Mike "It's in here somewhere" O'Cone—was the only person who could find what you were looking for

Unfortunatedy, that kind of setup, although interesting, does not encourage efficiency and can cause some degree of furstation—especially when you are trying to review several pieces of hardware under a rather tight deadline. The comparatively small confines of the Top paratively small confines of the Top one of our recent projects, when a bond one of our recent projects, when a bond on some of the top the top the top consumers, the only casualty, however, was an unfortunate associate editor who got caught in the crossfire).

#### Come Down to the Lab

Thus was born the PC Lab. Right now, the Lab actually encompasses three spaces. The first is the original Toy Shop, a rather small, two-room suite that



is now used mainly for storage. It is also now the base site for the Interactive Reader Service and, as a result, has become a second home for technical editor Craig Stark, who acts as the bulletin board's systems operator, information source, and all-around mother hen.

The second lab area, in PC Magalarés Ant Department is a small room that has become the unofficial hangout for computer graphics enthuistats. Visifor computer graphics enthuistats. Visibut which is not a similar to the computer to the working on-mad a few that the Art Department personnel simply became interested in. These days, the most frequent occupant of that room is art directified to the computer of the computer of the second of the computer of the computer of the personnel of the computer of the computer of the personnel of the computer of the computer of the speed most of his free time voluntarily

testing these systems, but has offered to take them home and continue the work there—leading some of the more cynical staff members to suspect that his eagerness to try out the new equipment may have something to do with his attacks of workaholism.

See What's on the Slab

However, the showplace of PC Magazine's new labs will eventually be a larger space now located in the subbasement of One Park Avenue, five floors below the editorial offices. This room is where most of our major testing and reviewing will be taking place.

But while the phrase the Lab may conjure up stark visions of gleaming hardware and quiet figures in white lab coats, the reality is slightly more down-toearth.

You see, while we expect the Lab to eventually become the clean, efficient space that all technologists dream about, the exigencies of publishing demanded that the room be put into use before the renovations had been completed. But while last issue's research on word processors was conducted downstairs, the first really large-scale hardware comparison to take place in the Lab was this issue's printer review.

Associate editor Barbara Krasnoff got a first-hand look at the space when she went downstairs ostensibly to talk to project manager John Dickinson about a couple of the new printers. She reports that it was not quite as bad as some of the writers (who occasionally enjoy exaggerating the adverse conditions under

which they work) claimed. For example, the room was not only reasonably well lit, but it was air-conditioned—a necessity in a room in which over ten machines may be operating at the same time. It was

even carpeted, a luxury that the old Toy Shop never had. (Of course, Krasnoff added, you couldn't see very much of the carpet under the bulky mass of printer paper, test booklets, and other items that

were strewn about the floor.)

Before we leave the new Lab, however, perhaps I should caution you not to take the Lab's appearance as an indication of the tests themselves. If our faciliaties were up to the high quality of our testing methods, the room would probably rival IBM's own building in hightech architectural splendor. In fact, judging from the amount of care and time that editor Bill Machrone, John Dickinson, and other staff members put into our testing methodology and software, you might expect to be greeted at the door by gleaming equipment, soft background music, and Mike O'Cone in a white lab coat

#### OPEN FOR CLOSED FOR BUSINESS SECURITY





OPEN OR LOCKED, The Neison Series from Simonton Industries is all business — the standard-of-comparison for compact, mobile security cabinets.

Security has been addressed with roll-up, lockable tambour doors that conceal and protect your computer, printer, and software when not in use. Unlock the hide-away tambour doors and the adjustable keyboard and printer shelves extend to transform the Full Nelson into a complete PC workstation.

And, every Nelson — Full or ½ — Is mounted on a heavy-duty, steel base with twin wheel casters. ..a mobile workstation ready to go where you need it — when you need it!

With all of these features in one workstation, it's no mystery why the Nelson Series has become the user's choice. Give us a call and find out what the Nelson can do for you!

Nelson

Simonton Industries 20746 East Carrey Road Walnut, California 91789 Telephone: (714) 598-2502 • 1-800-255-5069 ourspe CAUPORNIA

right down and get it!"

Unfortunately, the part was in Kaplan's Connecticut service depot. So

Mirror, Mirror While Dickinson was coping with print-

ers, Mike O'Cone was coping with parts of printers. It seemed that one of the vital parts of a laser printer is a small six-sided mirror that reflects the laser beam within a laser printer. Both Dickinson and Machrone felt that a photograph of this mirror would be highly interesting to our readers. Art director Mary Zisk concurred.

O'Cone, who is usually quite resourceful when it comes to finding unusual equipment, was stumped when he tried to get such a mitror separate from its parent printer. He called several major manufacturers and service centers, but while most of his contacts were willing to belp, they shook their head at his request. "Sorry," they said "it's just not something we keep in stock."

Poor O'Cone was getting ready to cannibalize a QMS Laserjet Printer—no small feat in terms of time and effort when he got a call from a gentleman named Wayne Kaplan from Computer Works, a retail outlet. "I have the mirror," Kaplan told him. "It had my technician extract it from a spare machine."

"Great!" O'Cone yelled. "I'll come right down and get it!"

Kaplan's Connecticut service depot. So it was several more hours before our messenger delivered the precious mirror, an object no larger than a silver dollar, into O'Cone's eager hands. Such small adventures are integral parts of great projects like the printer review.















### The Grafix Partner Enhances Any Graphic Created...

The Graphics Enhancement
Utility That Sits In Background.

It's always there ready to pool our behind 1-2-3 or any spreadsheet with graph us or any other graphics program. Use the Grafix Plantier to finish and refine any graphics of text screen. No matter what graphics soft ware you are using, you need the Grafix Plantier to the program of the Grafix Plantier.

Use Zoom, Undo, make a slide show with Cycle, change colors, use Patterns, Paint, Repaint, Draw, add Text using any 0.20 Fonts provided, add logos, Transfer art and logos, Erase, cut and paste, highlight, arroush, rubberstamp, Copy, Block transfer. Upend, Mirror, Swap colors, and more

The **GRAFIX PARTNER** is a graphics utility that uses all of the power of your graphics hardware and software, and adds its capabilities to both The Grafix Partner works with **Polaroid Palette** and will drive popular plotters and printers.

The GRAFIX PARTNER is available for 16 color and higher resolution boards with up to 136 colors. Wang and DEC versions are also available

#### The Grafix Partner \$149.

To order, mail form below today, or CALL 315/474-3400

Brightbill-Roberts and Company, Ltd.

120 E. Washington St., Suite 421 Syracuse, NY 13202 315-474-3400

trademark of the Polared Corporation DEC has tracemark of Digital Equipment Corpo-Wang is a trademark of Wang Laboratorias. Grafix Partner is a trademark of Brightbill-fland Corporate Ltd.



#### Speeds Up Everything ... Especially 1-2-3"!

The MicroWay NUMBER SMASHER triples the speed of all cpu bound software while doubling the speed of 8087 bound software while doubling the speed of 8087 bound software. When combined with MicroWay SASTBREAK IT results in an increase in the speed of 1-2-3" of up to 80 to 11 ll you're tired of WAITing, the SMASHER is the card for you! The heart of the NUMBER SMASHER is a 9-54 micro 17 the NUMBER SMASHER IS A 9-The heart of the NLMBERT SMAS-RER is a 9.54 mix. 8058 working with anothered laps beed 5067. The card 5058 working with anothered laps beed 5067. The card 5058 by doubling he system clock speed and quadrupling the class bus bundwing the class bus bundwing the class bus bundwing the class to bundwing the class for the system clock speed and quadrupling the class for the system clock speed and quadrupling the class for the system class of the system of the or card it does not augment the 5068, but replaces it with a special 5086 that runs as a frue 16-bit processor in the first 400% of ram and as an 8-bit processor everywhere else.

Examples of software which show dramatic speed-ups include AUTOCAD, 1-2-3" worksheets which depend hear on financial or transcendental functions, and multi-user op

on financial or transcendental functions, and mall-user oper-ding systems. Any program without with AMS 3/05, comble-dring systems, AMS 100, comble-dring systems. Any program without and the AMS 3/05, comble-well run on the NAMERI SAMAS-ER at least is indirect of 2.5 times faster SAMAS-ER at least is indirect on the Indi-cation of the AMS-ER and any program of the Individual adds cache routers are rolled and oring sposite. The NAMERI SAMAS-ER is an upgrade product for 100 bits program of the Individual Combination of the IBM-TO be and the Individual Combination of the IBM-TO be and the IBM-TO between the IBM-TO between IBM-TO and the IBM-TO between IBM-TO and IBM-TO and IBM-TO and the IBM-TO between IBM-TO and IBM-TO and IBM-TO and the IBM-TO between IBM-TO and IB

The World Leader in 8087 Support



P.O. Box 79, Kingston, Mass. 02364 USA (617) 746-7341

## AN HONEST-TO-GOODNESS 'C' INTERPRETER, PACKED WITH FEATURES

F ormudable C' At the Olympian Heights.
The language of the Priesthood. The intellectual Orad.
Well not any more. Now you can just sit

AND ONLY \$109!

Well not any more. Now you can just set down and RUIN/C<sup>TM</sup> being a around, turked with a even — dane we say — here fin with s.

Why has C undergone this C-change? Because RUIN/C is a C interprete, and a wery hall molementation of the language at

very full implementation of the language at that Until now. Chas only been a compied language. If you already use C you know that means editing your program with a test editor, saving the file, calling the compiler to translate your program file. finding the errors, and going back to the editor assuit, Great callioning discient:

#### If Only 'C'

Were as Easy as BASIC RUN/C is different You can write and run your program in tandem. Like BASIC In

has a couple of dozen commands such as LOAD MERCE, SAVE, and TILES. It has an editor, You can INSERY lines and EDIT lines and LIST and DELETE lines on the spot. The most commonly used commands are built into the function layer, so you don't have to spell them out. Then just say RUN. You program exe-

cases unearity if an error halts it. RUN/C explains why and where. You just EDIT the line, then and there, and RUN again.

#### A Great Time Saver for C Professionals If you are already a C user, you

If you are already a C user, you will you are already a C user, you will not be tramendous time savings of gering out of the compiler loop. You've probably been warmy for an merprevier. Untimately, you'll west to band you work to a compiler, for larking, for peed of essection. But RUN-C gives you a fast frost end. It is superio for bissum; away as a classer of functions unit proven.

fast frost end. It is superir for blasting away at a chester of fluncturs until proven indemunchle and susable for acceptance into the Gessi Project. RUN-C less a pro develop and test code rapidly, without fusey checking. No more making things extra stily to Get-Ready-Pet-The-Compiler, where a forgoten semcolon draws freen manuse in the penalty. box. With RUN/C you can try our things devil may care. Let if find your typos and malaprope. It's nothing to change them and re-RUN.

#### An Ideal Way to Learn If you are a newcomer to C. RUN/C

makes a splendid teacher its manual is as big as all outdoors. It contains not just instructions how to use RUN/C but its 478 pages provide a thorough going demonstration of the C language rise!! Every feature of RUN/C

all the language keywords like "for" and "while" and "case" all the buthen functions like "point" and "gete" and "puss" and "malloc" all of RUN-C's commands like "EDIT" and "LIST" and "MERCE" "has "and the factor of the state types like "the" and

- all see presented in a single alphabetool procession across most of the book. Each recorded by the control of the control of the control of the control of the with examples of the view to Control of the these chapters are devoted to RUN-Co builts infraction, and every one time is assimple program showing how it is used. These same programs are on the data. So as you read them in the manual, you can run them on the acreers, see what they do discover why they do it. And samper with them, try things out, see what they do chapters.

#### How RUN/C Does It

RBNO bandles the differences between the compiler and elegepters environments with great common seems. As an exercises with great common seems. As an exercises of expectan charge the sources but find the fact that the case paid in Médicia and other source code into — bundles pois lives already written, the seems of the provide source code like Corenides and BASICC The "boulded files stay holden. They don't both your labour, And they don't SAVIC with the mass you're sectionly on. 10 hi Intering your system with "feetings" (BASIC).

Or, external files may be MERGEd into your listing at any point — these will display and SAVE with the host file.

### The Features Keep Coming The more you look, the more powerful this product gets. It has valuable tracking

togales to show what's point on behind the scenes as a program securious. Sivinch on TROM, which displays on screen each line of outcome one as a securious for immunified with what the program puts to the screen behavior of the screen sech line in the screen sech line in the program when it departed for the back of beyond. Or ity TROM, which shows the current values of all standaline referred to exceed with a screen with a red deministry of the screen secondaries. Or surrice of FOOI want defend in a program where a run each line secondaries.

which aspect that the line was executed twelve times, a wind partire where to optimize for efficiency. There's more RUNIC has just added memipts for PC DOS users, functions which hall concount of your program to disectly call for services from the

operating system, and then return to your program right where x left off Even Shell Capability

## And more stall RUN/C has a SHELL command which will stroke any operating system command, with both RUN/C and your program stall in memory. No need to

post and reload everything
And finally, the EDITOR command
When RUN-C arrives, tell if the name of
your favorite editor's COM or EXE file
Ask for it and RUN-C will load your editor
in parallel so you can switch back and
forth (You'll probably need more than
255K)

It's all here. A thoroughly satisfying ptegration of text, source code exemples, eding, interpreter and unlines which will add both speed and pleasure to programming Product Code \$9800 ° Our Price List Price \$150.00 \$109,00 NOTES FOR THE PROS.
WE KNEW YOU'D ASK, SO...
RUN/C occupies 185K, and requires
256K, it can handle programs of up to 2000
lates its hundred-plus built-in functions

code, a claim national price but have not up to account in memory price but in incidences in humanitaria frames. In humanitaria frames in humanitaria frames in humanitaria frames in humanitaria frames fram

Structurated, turnolis, etc. attendances are supported, as whole as keyboard as creen rectirection from and to files. The rectirection from and to files. The rectirection from and to files. The rectirection are functions to access porns. No esterior defendance, and all functions must be "Privated or Mark (Park 1997) and a manufacturation of the properties of the propert

THE BIG CHANGE FROM BASIC TO G. By an en BASIC proparations and have order the message that G as where the word is beeded, then we have the perfect package deal. With your RUNG C will also and you BATIC To answers the question of what is do with all the BASIC G. And well send you BATIC TO answers the presence of what is do with all the BASIC G. F. and the perfect of the perfect of the strength o

RUN/C, RASIC-C. RASTOC Combined Last Price \$675.00 Out Price. Individually: \$560.00 All Three Bundled \$495.00

What Are You Waiting For? The Number is..

800-PC BRAND
That's (800) 722-7263. In NY State call (212) 410-4001.
PC Brand PO Boy 474 New York NY 10028

### PC BRAND: PROGRAMMING TOOLS FOR 'C' PROFESSIONALS

#### LIBRARIES: to Speed Programming

Y ou cannot go wrong buying any or all of these compendious compile tions. So cost effective that use of just a few will save a bundle compared to

#### LATTICE C-FOOD SMORGASBORD

Decimal Anthmetic Trigonometric loganthmic functions, powers, conve sion to strings, BCD operations for numbers up to 16 significant digits.
Level 01/O Functions: Direct operations for screen, keyboard, prister, and asynch port to minimize memory usage and maximize speed

18M PC BIOS Interface Access. Gets. basic I/O services in ROM BIOS not available from the operating system to get and set keyboard modes, printer port status, video attributes and cursor

#### positioning Terminal Independence Package for transport to other types of terminals Product Code S0000 \* Our Price \*115.00 Last Price \$150.00

#### GREENLEAF FUNCTIONS

More than 200 functions in both C and assembler source, and a 200 page manual with examples and demos 32 DOS extensions file and direc-32 DOS extensions file and direc-tory manipulation for DOS 11 and 2 0 23 Screen Functions Select mode. page, monochrome or color, palette cursor shape, positioning, clearing and scrolling, pixel get and put, read

#### BTRIEVE Arguably the Best B-Tree File Handler Available

#### I I your programming still gets any-where near the files, here's our quarantee Nothing will increase your

#### PMATE The Programmer's Word Processor

mers. We'll wager that you cannot find a programmer who has discovered mate and moved on to something else. Progress a full screen editor with ten preces of text until needed. It uses single text, or insert or delete, or rescue several thousand characters of deleted sext It has a format mode for sab setting or wraparound and shaping when it's time to write documentation. Pinase lets you assign chains of commands or strings of text to single keys a keystroke could set up the entire shell of a new C function.

Prane has variables, if then state ments, loops. It calculates, and converts decimal to hex to binary and back. You macros") to delete comments, for exam ple, or check syntax, or process long se quences of commands. Macros can alphabetine lists, do row and column math ple files, even summon other macros
Pur another way. Pmate is a text editor with its own built-in inserpretive lanquage A language you can use to c sierely customize this text editor to your ancy Possibly the most artful, ingenious

program you have ever seen Product Code S0600 \* Our Price Lest Proce \$225.00

strings including center and justify, efficient list operations which add, delete, and sort pointers to strings for top speed 50 Graphics Functions Primitives to access all graphics; type(see, formstting, and forms control
Plus keyboard status and function algorithms we could go only

Product Code: \$0770 \* Our Pro Last Proce \$185.00 \$140.00 GREENLEAF COMMUNICATIONS

with other usess or remote date bases Owe 80 functions and demo programs in both C and assembler source code set arate transmet and receive ring buffers for an arbitrary number of ports Inter rupt control means you can download a second then halt the incoming stream to file it, display it, let the user tamper with it, send it back up line. Goodbye separ-

it, sand it back up line Goodbye separ are communicatins software. Supports ASCII or binary, any parky, any word length, 8290 UARTs, all four Lattice Cimemory models, Hayes 300, 1200, 1200B and other modems. Has 80-page manual with each func tion. Library and demo programs of with both C and assembler source.

Product Code S0750 \* Our Pro Last Price \$185.00 \$140.00

#### ing job to a sophisticated file manager Buseve<sup>TM</sup> is the best we have seen. It takes complete charge of all file index ing, reading, writing, insertion and dele-tion. It builds 22 commands right into the language you use in the form of functions you call to tell Bineve what to do. The commands create, open, and close files, files by ascending or descending key find any key in a milion-plus item index in four or less accesses Bineve comes with interfaces to C Pascel, BASIC, and COBOL, and the manual gives you working sample pro-grams which demonstrate every com-

mand in all four languages. The in presentation which led PC World The kind of exclaim "for those of us who have en-dured poorly written and inadequate manuals, this one is a pleasure to read Brineve has mainframe specifications: A single file may have up to 24 indexes Segments of keys may be indexed. Each index can independently accept or block duplicate keys. A record length can be up to 4090 characters, an index length 255 characters. A file may be 4 billion bytes It can even extend a file ss two drawes - even two hard disks With Btrieve you are freed to think log wasting dickering with intricate file ref erencing schemes and sorring algo-rithms. Thinking shifts to a higher plane

Product Code 90690 Our Produ Let Price \$245.00 \$199.00

### Size Unlimited with

This Overlay Linker S offware is becoming ever more sophas-ticated, which means more complex programs requiring large churics of

memory But if you use extra memory, you are counting on users to have expanded RAM, and will forego sales to those who Plank 86TM is the answer It shoe-ho large programs into small memory First. Plink96 acts as an alternative to DOS Link C encourages design of separately com-plied object modules in the Microsoft re-locatable format. Plink#6 pulls modules to gether into single compiled programs. But Plink96's ownlaw power is what has gained it a reputation as a miracle worker. It bunds ager which knows how to swap modules of occupy the same memory space.
Unlike other indees, the overlay man ager acts on its own, needing no calls from the source program Instead, Plink90's straightforward overlay description language allows you to describe your overlay structure in one place in your program — a structure permutang up to 4.055 overlags stacked 32 deen. No re-

compaing to re-arrange the structure! Plink86 can even sub-divide as linked output irso multiple files for programs which must span more than one disk.

PC Tech Journal calls it The premier Information loader that's taking own at many of the programming shops around

#### Product Code: \$0500 # Let Price \$395.00 \$315.00

BASIC C Use Your Knowledge of BASIC to Learn C

I f you've getting the message that swectung from BASIC to C would be brudent, you've about to discover that it's back to basics of a different sort BASIC is fat with hidden functions that stripped Gone are all those handy st Come are as inner standy smarty manage utages also [EFTS, MIDS, STRINGS; etc. In C. when you reach for even sample smoothers like INPUT or PRINT!—well, underlying such expressions in BASIC are bulging macros which C cannot have if it is in leasn the sign receival.

keep as slam prof to keep its sum profile.

But now comes BASIC\_C and all your old favorates are back. Over 80 routines to open and close files, field and perform conversions on file buffers, peek and poke print using clear screen, 'instr', on error goto they're all thece Some have re-worked names and syrrax to sur C but all are written as one-to-one functional equiva-lents to the familiar feetures of BASIC And they are documented one to a page an alphabetcal sequence like the Microsoft menual for added familiarity Plus a first

rare chapter companing how BASIC and C So with BASIC-C, when you're thinking INPUT, go ahead Use a. Or LPRINT or LOCATE or INKEY But without BASIC\_\_\_ you will find that every line of code plunges you back in the C tests to figure out how to write it. Someday you'll want to, but for now, BASIC\_C will start you programmany cruckly at the statement level so that you can concentrate on C's larger concepts.

Product Code \$0350 # O Last Price \$375.00 \$145.00 It Translates Your BASIC Programs Into C Y cu'd like to upgrade C, but what to do with that warehouse of BASIC routines you've carefully polished over the years?

BASTOC

And how to face converting your famous Leviathan accounting system from BASIC. Peckage\*
With BASTOC TM a translator which takes in BASIC source code and emit:

pure Kernighan & Richie C Our BASTOC understands Microsoft Extended BASIC (except for dynamic dimensioning and common) Is will optionally convert your program into a single monolithic C function or will decompose it into separate functions, one for each OOSUB label Strings are dynamically allocated in the targer program, indring your application of BASIC's calatoric halts for garbage collection. BASTOC will try to create structure of even the most convoluted BASIC code, and writes any indipestible statement trio the Courput as a comment plus explanation. Also, you optionally can tell BASTOC to ment BASIC source lines under the C target as comments. Source code of several modules of the translator and library are provided so you can tailor BASTOC to your environment if needed. And source of the entire product

Product Code: \$0370# Our Pro Last Price \$350.00 \$280.00

#### LATTICE WINDOW All Your Applications

Could Have Windows! W indows are no gammack. Ask any user of a windowed product But how do you add this technique to

your applications without disappearing for several months of R&D<sup>2</sup>

With Lattice Window TM A rare wrem before window TM A rare programming tool which will change the way you think of program design. Lattice Window takes was all a ndow takes over all acreen management it is an extensive set of object code functions which you meenly call from your C program.
Think of a window as a screen of flex Think of a wintow as a screen or near-tible size. You can tell Lance Window to open and close up to 255 virtual screens from hid to 255v255 bytes. Then tell "Window" to display any portion of these virtual screens on the physical screen.—

as many as \$1 - wherever you want. overlapping and overlaying at will Windows no longer needed may be closed. Any background area over earlier (which could be corners of several windows) will pop back to the screen Think for a moment what a peo-gramming job that technique represents To your program, the entered window is the entire screen — all sow and column references are relative to the window no matter its absolute position in the screen. All scrolling occurs only within the active window. The cursor will not leave its You can grow it to display more of the underlying virtual screen. Or shrink it . You can control screen attrib

(color, buriking, inverse video, etc. You can direct output to either the monochrome or color board. A formidable product to add in able flair to your next application Product Code S0800 \* Our Pri Lest Price \$295.00 \$235.00

Phoens Software / BASTOC TM JAVI Software / BASTOC TM JAVI Software I'm Software I'm Software I'm I'm Javi Software I'm I'm Javi Software I'm Javi Software I'm Javi Sago care / Contragge Micro Software Developers, Inc. / PC Stanc. Crafter TM PC Clant

### HIGH SPEED SOLUTIONS FOR APPLICATIONS DEVELOPMENT

Premier Graphics Library Now Supports 21 Boards Halo has become so H ald has become so dominant graphics standard that the newest incarnation, Multi-Held, supports 21 graphics cards, and comes with a distude of mouse and printer drivers. All with one purchase, replacing the previous one boasd per copy. The latest weston adds support for the AT&T 6300 and the IBM enhanced graphics card. interactive users, area moves produce animation, fill and flood commands paint

and me law enanced graphics can.
Within your Lattice program a function
call can reset drivers. You can arrange
that your application program doesn't
care what board the customer has, you
can even switch boards within a program. when two different monitors are used Halo is a complete library of graphic anctions which can be linked with your attice programs to create full-col charts, graphs, simulations, animation Over 100 commands are at your dis-

#### posal, including plot, line, arc, box, cur Version 6 Adds REVISED!

the 3rd Dimension The newest wesson of this premier par acreed designs with up to ten overlapping screen with pop-up lists, help boxes, and alternate sets of input fields.

Writing your own screenware is a good way to blow completion dates and profits Panel<sup>TM</sup> works with you interactively to set un foolneoof screen dupling and data entry forms rapidly. It tests your form to prove that it (and test data) behave one rectly, then converts the firsthed work into C source code for incorporation into your application, and compilation with Lattice. Wonderfully diverse attributes may be selected for any field - sun, data type, col or, of course, but also conversion of input when new entry is started, masks for stan-dard formats (eg., dates, phone numbers), a choice of styles for numeric fields, phrases which fill in when their first letter is typed.

altiple-choice lasts from which to chi field fill-in by curroning a highlighted bar fields may be multi-lined (e.g., name and address as one field) and acr than the screen space allotted them Panel builds in a user interface for keystroke movement within and between fields, and supplies energive valdation soutines for checking user field entries in source code, so you can tack on your

own unique variants.
Panel's screen layouts can be assigned to individual windows under Lattice Window control Screen designs may be dy namically loaded from file, or compiled into a program, and werson 6 has opti miged code to quicken display speed he whole package is wrapped in a mon tor and lovyboard customsonon peckage to tailor\* your application for other ecuspment

Panel A superior productivity tool now heaver then even Product Code S0400 \*\* Our P Last Price \$295.00 \$235.00

## S OF SALE

pping & Handling U.S.: UPS Surface: In duct \$8, each and 19300. UPS 2nd Day Air product \$10, each and 194-50. UPS Nand Day or Federal Express: Int product \$16, each 1186 NonU.S. \$15 per order for export/impor

ber graphs and pie charts. Pattern-fill and dithering commands give your graphics impressive texture and color mixes, rubber-banding draws shapes for

areas Multi-Halo allows you to define Product Code S0590

Last Price \$250.00 \$199.00

Dr. HALO Multi-Halo is a library of functions to utilize from your C program. Dr. Halo is a standalone program, written in Halo its dazzing. Your screen becomes a canvis.

and a mouse (preferable) your paintbrush to take you wherever your imagination leads. Save the images to disk, run them by with Dr. Halo's slide show feature. Suggestion? Use Dr. Halo as a freehand sketchpad to design what you want your application to do. So you can see the end

Product Code S03IS Last Price. \$99,00 \$75.00

EXPORT EXPERTISE ow expect observables and pup to you or your agent by air percel post, air freight or countr. Phone or Telex your order. Pay by credit card or wire funds to PC SRAND, % Chemical Bank, 136 East 80th St., New York, N.Y. 10038, Account No 004-01608. We will

#### LATTICE C COMPILER Over 25,000 Users Make it the Best Seller by Far

Lattice C has been the standard-beare computer for years. Peter Norton in PC Magazzne (1/8/85) said, "best for systems po CDEBUGGER NEW MSD's Source Level Pesticide gramming tight code total control of what's going on noticeably better than any of its competition. After reviewing rare compilers for the PC the PC Tech fournal unequiriocally declared Latice C "best for software development." if com- e've offered "symbolic" debugg for some time. They can refer to program symbols — the names you give to variables, functions, etc. in your source programs — so you don't have to debug C

piles fast and produces fast programs."
When Lettice C appeared, there was nothing comparable. Ever since, software programs by way of hex memory address es. Now along comes a true source level and function libraries to marry into Letter developers have created exceptional tools debugger for programs compiled with Lattice — and at a breekthrough price. Switch on the Cdebugger<sup>TM</sup> source. resource of libraries and unlines intended for Latice C to speed their work. That's a display, from the beganing or at any breakpoint and enter the uncourse exper mai consideration in choosing a compiler ence of watching your source code step by, one line at a time. Or stop ahead it lines and display from there. Or browse through Better check whether the latest geewhat biffer Chieck warrant me inten prevaulation may have only georgene to go with a Latine C rurs on virtually any computer using an 808 or 9086 chip, and generates oode which optimizes use of the 8087 chip. If present Create your source files with source from the surrounding program area — even from another file. Multiple breakpoints can be assigned to any word processor or test editor and Lasof memory can be set read-only to let a toe C will compile them uno finel 8095 object module format for linking to other modules by DCS lank or our Plank96 Lantoe C offess a choice of four memory modules between 64K and RAM capacity for form of wrise protection help find the most elusive bugs, like poster encroschment Trace options allow display of function names program and date to allow you to choose the point combination of small memory effidandy roadmap of how you got lost Other commands deplay and alter

the right commension or small treasury ex-ciency and large memory addressability is a full implementation of Kernighan and memory and requires, show and replace expression values. Simple variables may Rochae (KAR), with 39 character vanable be referenced directly by name No last of source faes need be provided to Cdebugger It samply targets all ic fales names, nested comments, transcendents and Unix meth functions K&R digin't think to mention, and some of Unix s most useful directory Cdebugger four memory models. Needs 256K program into memory alongside the first Product Code S0100 \* Product Code S1100+ Our Proce Last Price \$500.00 \$135.00

\$295 AA Last Prace \$165.00

#### LIFEBASE PROFESSIONAL Try Out this Powerful Database & Applications System for 30 Days

nie large program systems. Each menu tive bids, you know that a high level lan-guage with built in data base management Life base Professional<sup>TM</sup> is the Linear elaboration of a mature product we've never had the marketing budget of a dBASE<sup>TM</sup> or RBase<sup>TM</sup> PC Board's order

entry and receivable system is written in Likebase. Hereay for a C dedicated company? Not for a hurry-up custom system isn! We chose Lifebase because no off be modified, and we needed solutions right quick. Sounds like what your cus-tomers six, doesn't it? Lifebase's built in relational data base sankair is a powerhouse. Each field of a secord can be related to up to six other files Any field (or two) in a record may be used to crease any number of indexes to a file. And when client use succests impri

commands. Your systems can easily grow or adapt as a cizent's needs change.

products with the replaced in whole or part. Payment: We honor: American Express Master-Card & Visa (no austherge), checks in arterior. COD for control of basis, the East 65 in New York. Account: 034-016508. Parchise orders accepted from Eagre corporations as institutions at our decreation. 25 or most? accept the payment of the COD of the acceptance of the COD of the COD of the acceptance of acceptance of acceptance of acceptance of acceptance acce

listing or screen can represent an elabor Lalebase will execute automatically And a many of a specification's reports with no Lifebase is above all a programming lan guage. A compiled language with result-ing speed. A very high level language of ic statements which consure a plens tude of behand the scenes activity. A sparse disciplined language to keep you out of trouble. Most important. Lifebase belps you create every program statement Use a function key to say what type of statement you want and Lifebase pros in plan English for what it needs to construct the statement (field names, files where to find them, etc.) The result is preedned, indestructible code Error free programs on the first try are not unusual Forms and displays are designed on what the screen is to look like. Then fill in the code that will drive the screen. Nothing

oin read and write ASCII files, so you can interface with spreadsheets or word proc Above all Lafebase is reliable in a year's beary use we've seen no burs no crashes sed ongoing support from the Lifetiuse descriper group, which will refer prospects

to you in your area, and may even repre-sent your Lifebase applications nationally This could lead to something big So here's our offer Out for the demo and as never our oner Opi for the demo and its cost will be applied to your purchase of Labbase Or end the selection process streight awy Order the full Lifebase
Professional and use it for 30 days,
manuals, disks, the works. If not thoroughly
impressed with the power of this product.

Full System Code \$0990 Last Price \$796.00 Demo Pack \$35.00

\$555.00 Applied to ultimate purchase

title other languages where screen displays are unvalidly based in program text What're you waiting for

## 800-PC BRAND

That's (800) 722-7263. In NY State call (212) 410-4001 PC Brand, PO. Box 474, New York, N.Y. 10028 Telex: 667962 (SOFT COMM NYK)

© 1985 PC BRAND Private, terms, and apar

CIRCLE 311 ON READER SERVICE CARD

## 1-800-241-8149. ORDERS ONLY TWO NUMBERS

Locally or across the nation, you're only a phone cali away from the best advice, information, sales and service for all your

computer needs. At Micro Mart. A name you can trust. We're proud to offer the widest range of computer products anywhere. At very

competitive prices. With innovative financing options like the Micro Mart Blue Chip Credit Card. When we say a product Is available today, we mean today. Our Micro-to-Mainframe inventory system keeps

our products current. And our customers satisfied. We deliver quickly because we're geared to ship hundreds of products daily to customers all over the world, But we don't stop there. Micro Mart offers a com-

prehensive range of Technical Support and Customer Service after the sale. We're on-site with hundreds of service locations nationwide. And our National Service Center is one of the fastest

depot services in the USA. Call Micro Mart today. You'li meet people who back up price, availability and service with performance. You can count on it.

#### COMPUTERS

AT&T Color and Mono Systems in stock Start at \$1995 COMPUTER SPECIAL OF THE

#### MONTH Call for details! NETWORKING/ PROTOCOL CONVERSION

SNA & RISYNC 3780, 5251. Mod 11 & 12, 3274, 3278 PC TURBO 186 by ORCHID. 80186 coprocessor board \$599 IRMA Complete line From \$829

#### PRINTERS &

**PLOTTERS** We have thousands in stock. PRINTER SPECIAL OF THE MONTH Call for details! HOUSTON INSTRUMENTS Plotters

and Digitizers in stock DOT MATRIX **EPSON FX85/185.** EPSON LX80/100, LQ1500\_ COMREX 420, Epson compatible, 400cps \$1695 OKIDATA 192 & 193, ML84, Pacemark 2410.

OKIDATA Color printers, complete line\_ TOSHIBA P-351 & 1340. New Low Prices! TEXAS INSTRUMENTS 855

From \$729 LETTER QUALITY NEC Spinwriters 2050, 3550, New Low Prices!

We carry a full range of form handling options.

### FLOPPY DISK DRIVES

TANDON TM 100-2, DD/DS, 360K New low, low price! 1/2 HEIGHT Disk Drives from Shugart, Mitsubishi & TEAC PC, XT & AT Compatible \$115 SPECIALI Two 1/2 Height Drives, " cables & brackets.\_\$219

HARD DISCS Micro Mart carries many of the major brands. If you don't see it-ask for it. PEACHTREE TECHNOLOGIES P-10. & 20, int. & ext.\_From \$595 SEAGATE Fast 20 Meg. int. From \$675 PEACHTREE TECHNOLOGIES New 1/2 Height Tape and Winchester back-up system\_\_\_\_\_ SYSGEN 10 & 20 Meg.

w/streamer tape New Models-Call SYSGEN Image & Quickfile, Streamer tape for XT/AT New Price! BERNOULLI TECHNOLOGY Hard Disc Subsystems \_\_\_\_\$2595

CHIPS All our chips are tested and priced for quick sale. Call usl INTEL 8087, 80287, high

speed coproc.\_ 64K-256K RAMCHIPS \_Call for Market Price.

### MULTIFUNCTION BOARDS

We have a complete line of Multifunction Boards compatible with the Portable, XT/AT. THE BOARD SPECIAL OF THE MONTH\_ \_Call for details! SIX PAK 64-384K, multifunc.\_ MPII RAMboards for PC's &

compatibles. I/O MINNIE I/O shortboard for Portable & AT. ADVANTAGE 128K-3Mb, expansion for AT. QUADRAM QUADBOARD, 64-384K, multifunc.\_\_\_\$239 TECMAR CAPTAIN, 0-384K.

TALLTREE J-RAM 11\_ New Low Pricel

\_\_\_\_\$185

#### GRAPHIC CARDS PREVIEW Mono Graphics/

multifunc.

Hercules look-alike\_\_\_\_\$269 HERCLILES Mono & Color Graphics cards New Low Prices! TECMAR Graphics Master, HiRes Color & Mono supports QUADRAM Quadcolor 1 & 11 color cards

PARADISE Multi-display or modular graphics cards

From \$199 STB Chauffeur & Colorific, \$289 & \$189 SIGMA Color 400 for PGS



## (404) 449-8089."" U CAN COUNT ON.

SOFTWARE
SOFTWARE SPECIAL OF THE

MONTH. \_\_\_\_Call for details!
ACCOUNTING
SORCIM/IUS Complete line
including Windows\_\_\_\_\_

From \$289/each
SPREADSHEETS &
INTEGRATED PACKAGES
MICROSOFT MultiPlan,
w/tcmplates

SORCIM SuperCalc 3, vers.
2.0 New Low Price!
ENHANCEMENTS &
UTILITIES

FOX & GELLER Complete line for dBase II/III. Rbase 4000 NORTON Utilities 3.0 \$69 ROSSSOFT FOXCY 3.0 \$89 RONTRAL POINT SOFTWARE COPY II PC \$80 FINTED FOR THE SOFTSTYLE SEE FX + and Printworks, printer control BORLAND SideKick and Utilities of the SuperKey From \$35 LIVING VIDEO TEXT Think Tank \$125

COMPILERS & LANGUAGE TOOLS

LATTICE C-Compilers \$299
MICROSOFT Complete line BORLAND Turbo Pascal, Turbo

Toolbox & more\_\_\_\_\_\_\_From \$35/each
GRAPHICS & CAD
Micro Mart carries many of
the major CAD packages.
Call if you don't see it listed.

Z-SOFT PC Paintbrush, mouse graphics \_\_\_\_\_\$75 DECISION RESOURCES ChartMaster Latest version \_\_\_

MICROPRO ChartStar
MICROSOFT Chart \$169
COMMUNICATIONS

COMMUNICATIONS
MICROSTUF Crosstalk XVI.
Latest version\_\_\_\_\_\$99
HAYES Smartcom II\_\_\_\_\_\$85

WORD PROCESSORS
MULTIMATE w/spelling checker
& tutorial \_\_\_\_\_ New Low Price!
SAMNA + \_\_\_\_\_\_
MICROSOFT Word. New

version New Low Pricel
LIFETREE Volkswriter Deluxe
\$169
SSI WordPerfect, version
4.0 2269
MICROPRO WordStar Professional series New Low Pricel

OFFICE & PROJECT
PLANNING
HARVARD TOTAL Project
Manager \$299
SORCIM/ILS Super Project
MICROSOFT Project \$175
DATA BASE MANAGERS
Call for unadvertised Data

Base Managers.
MICRORIM 4000 or 5000,
Report Writer & Clout\_\_\_\_\_\_\_
New Low Price!

New Low Price!
WARNER SOFTWARE The Desk
Organizer \_\_\_\_\_\_ \$145
MICROSTUF Infoscope \_\_\_\_ \$149
MODEMS

HAYES Smartmodem 300, 1200, 1200B & 2400. We have the best stock in the USA \_\_\_Call! VEN-TEL 1200 Baud Half Card w/Crosstalk \_\_\_\_\$419 POPCOM Int. & ext. w/voice

& data
AST Reach Modems
Special Introductory Price
MISCELLANEOUS
DYSAN Diskettes at the lowest

DYSAN Dislecttes at the lowest price in the USA \_\_Call!
MOUSE SYSTEMS PC Mouse, optical w/software \_\_\_\_\$13
MOIGNOSOFT Mouse, bus or serial mechanical \_\_KEYTRONGS 5151 & 5152
kcyboards \_\_From \$149

serial mechanical
KEYTRONICS 5151 & 5152
keyboards From \$149
KENSINGTON MICROWARE
MasterPiece \$99
CURTIS Accessories, Pedestals, cables, etc.

HAYES Mach II & Mach III Joysticks \$39/\$45 QlADRAM Microfazer print buffer 8-128K From \$129 TRIPPELITE ISOBAR surge protectors, 4 & 8 plug. From \$49 POLAROID Palette \$1195

POLAROID Palette: \$1195 PTI Back-up power supplies New Low Pricesl MONITORS AND CRT'S PGS Max 12 (E) amber, HX12, HX12 (E), & SR-12

\$129/\$119/\$169 ©1985 Micro Mart, Inc. Technology Corporate Campus 3159 Campus Brive Norcross, Georgia 30071



## THE COMPUTER TELEMARKET MICRO MART

CIRCLE 133 ON READER SERVICE CARD





To get a lot out of your printer, you need a lot of programs, right? Wrong.

True, you want the power to change type sizes, create your own characters, and even print sideways. But you don't need a lot of printer utility programs like Sideways, Fancy Font and Facelith

You don't need to pay for all that, either. One easy-to-use program called Printworks will blow all the others right off your shelf. Printworks," it's loaded.

ਹੋਰੋ SoftStyle

SPEKES, Chilityle products are evenlable at ComputerLand and other fine dealers.
Simple Menu Correct Perut Primar i Pers you pris stresslyed quickly and easily i Prinst hall SM character set including line graphics, math and science symbols.
Foreign language characters - Easily set print modes condensed, emphasized and more is Create new characters or entire from from the characters and more in the characters are controlled to the characters and more in the characters are controlled to the characters and the characters are characters and more in the characters are characters and more in the characters are characters.

McChewrite (P2-3, P3-3), CKICATA, MIL 54 Sep 2, ML 92 and 93 with or without Plug in Play Mr. Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and PLUG in Pacemark 2395 and 2410, and STAR (General Machine) and STAR (General Machine

BUYERS GUIDE TO		<u>,                                    </u>	$\angle$	
PRINTER \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	The Park	****	8	
BUYERS GUIDE TO PRINTER UTILITIES			8.7.7.0 1.4.7.0	1
	÷	•	<del>-</del>	<del>-</del>
Custom font design	YES	NO.	NO.	YES
Quad density . 16 x 24 dots/char LQ-1500 24x9 dots/char	YES	NO	NO NO	NO NO
LO-1500 .24x29 dots/char LO-1500 .24x37 dots/char	YES	NO NO	NO NO	NO VER
Graphics mode screen display Single-key current character teet print	YES	YES	NO NO	NO NO
Custom font loading from manu Unlimited custom font library	YES	YES NO	NO NO	YES
Alternate oberester sets on menu	165	NO	NO	
	YES	NO NO	NO NO	NO(7) NO(7) NO(7) NO(7)
IBM Graphics 1 character set IBM Graphics 2 character set IBM Screen character set	YES	NO NO	NO NO	NO(7)
	YES	NO YES	NO NO	NO NO
Graphics charactere link vertically Simulated download, MX, RX, etc.	YES	YES(0)	NO	NO
Supports pathnamee Configuration, lost and print tiles	YES	YES	NO	NO
Printer format control				
Elite, compressed, enhanced, atc Line spacing	YES	YES YES(0)	NO NO NO	YES
-n/180 (LQ-1500) Right & left margin	YES	YES(0)	NO	YES VO
Set form length lines & inches Set unidirectional printing	YES	NO NO	NO NO	YES
Set haif-speed & proportional printing Select 9 Epson language sets	YES	NO NO	NO NO	YES
Letter quality graphics printing				
Double density graphics Quad density graphics	YES	NO NO	NO NO	NO NO
RAM printer buffer up to 32K Buffer on/off control	YES	NO	NO	
Print current buffer control Abort current buffer control	YES	NO	NO NO	NO NO
Command line printer setup control		NO	NO	NO
Autoexec, bat file operation Unimited stored settings recall	YES	YES YES	NO NO	NO NO
Unlimited menu setting store & receil				
Single-key reset to default settings Configuration file settings storage	YES	YES	NO NO	YES NO
Sideweys printing Menu selection of 6 tonf sizes	YES	YES	YES	NO(6)
	YES	YES	NO NO	NO VES
Sideways font design One-piece "glued" spreadsheet output Character & fine spacing control	YES	YES YES	YES	NO NO
	YES(10)	YES(10)	YES	NO.
Top & boftom margin control Paper width choice/6" or 15"	AES	YES	YES	NO NO
Printer selection from menu Menu printer port selection	YES	YES	NO(1)	NO(1) NO
	YES	YES	NO(2) NO(3)	YES NO(11)
Spreadsheet page setting constant Requires input of # of rows ONLY Avoids user calculation of "gluefines"	YES	YES	NO(5) NO(4)	NO(11) NO(11) NO(11)
Special features				
Typewriter output mode Printer setup string teature	YES	YES	NO NO	YES(S) NO NO
Print direct from word processor Supports function keys	YES	NO YES	NO NO	
Master select code teature Enable Epson NLO option	YES	NO NO	NO NO	NO NO
Directory detault change from menu Drive default change from menu	YES	YES	NO NO	NO NO
Indicates unevaliable options	YES	VHS	NO	NO
Single-key sample print routine Printer selection from menu	YES	YES	NO NO(1)	YES NO(1)
Mouse software interface Help screens	YES	YES	NO NO	NO NO
Single menu, all features Price	YES	YES	NO	NO

## If you bought Sideways," it's time to upgrade.

#### To Printer Boss.™

Printing spreadsheets sideweys is one of the handlest software tricks to come out of the PC revolution. And Sideways<sup>TM</sup> is a nice little program. But

Sideways doesn't support pathnames, and doesn't let you design your own sideways character fort, end doesn't let you store an unlimited number of meru settings, correct of the side of the side of the side of the correct of the side of the side of the side of the you typewiter output mode. And Brend X soesn't eine you

Printer Boss does give you all of these things, plus aimost everything else you could ever want in printer utility software for the obt-matrix printer, including two eletter quality from a plain-English menu, with a few keystokes, and all controlleble vie commend line from a plain-see, but file.

And Sideline™ is for those who want sideweys printing only, at a special price of \$59.95. It includes sideways printing, sideways for design, typewriter mode, command line Input, menu settings storege and much more.

Don't settle for less. If you could be sold to see the settle for less. If you can sold see the settle sett

#### 203-838-1844 (Information) 800-321-0409 (orders only)

CONNECTICUT SOFTWARE

30 WILSON AVENUE ROWAYTON, CT 06853

NUMBER OF THE STATE OF THE BOST A Better via 0 triangle.

On program (PRepare of three bost A better via 0 triangle to program (PRepare of three procedure for Linux via the program (Prepare of three procedure for Linux via the program (Prepare of three prepare of



Published list

**▲** Connecticut Software

188.88 89.88 80.00 ?

Call Oryx for price, support, service...it's that simple

Prog's ..... aa\$ 49
Cantrel Point
Copy II PC .... \$ 34
CompuView
V-Print .... \$ 99

PROGRAMI CORNE	MERS
Borland	
Turbo Pascal	
(v.3.0).	\$ 45
CompuViaw	
Vedit .	
Vedit+	
Digital Research	:h
Concurrent CP	
white days	M \$115
w/windows DR Assembler	8
Tools : 86	125
Fortran 77 - Dos C Basic Comp.	295
C Basic Comp. Concurrant PC	86. 355
Dos (v.4.1)	239
New Produ	
Gem Draw	
Gem Desktop .	36
Emerging Tech	
Edix (editor)	\$139
Harilaga	
Smartkey II + .	\$ 75
Microsofi	
Basic Comp	249
Morgan Compu	ting
Prof Basic	\$ 71
Trace 86	99
Patar Norton	
Norton Util 3.0	\$ 56
Supersoft	
Fortran	.\$209

Ashion-Tata
d-Base II ... Call
d-Base II (v. 1.1) ... Call
Framework ... Call
BP Personal Accl'g ... \$ 69
Borland
Side Kick ... \$ 37
Turbo Pascal (v.3.0) ... 45
w/8067 ... 75
Suparkey ... 55

V-Snell 99	
V-Spell 99 Connecticul Software	1 000
Printer Boss	1 800 8
NEW (v.5) \$ 99	
Consumer Software, Inc.	WISCONSIN 1 800
Soraad Sheet Auditor	INT'L TELEX: 26
(v.2.0) \$109	
Data Trensforms	Technical Support/Ordar Call (715) 848-1374.
Fontrix \$ 95	Can (ris) out 1574
Dacision Resources	MDBS, Inc. (Con't.)
Chart-Master \$245	K Text 109
Sign-Masler 175	K Paint
Digital Markating Grammetik\$ 60	K Report 139 Manio Corp.
Proofreader 42	In-Search \$319
Dow Jones	MicroPro
Merkel Analyzer 229	WS ProPak (WS.
Emerging Tachnology	CS, MM, SI)\$255
Wordix (formatter)\$139	Wordstar 175
Prof Writare' Pkg 319	Wordstar 2000 255
Enertronica	Wordslar 2000 + 295
Energraphics \$209	Microrim R:Base 4000 \$285
w/Plotter Option 269	R:Base Clout (v.2.0) . 159
Fastware	Report Writer 95
Thor\$245 Financiar, Inc.	R:Base 5000 429
Financiar, Inc.	Microsoft
Tax Series 105	Flight Simulator \$ 39
Fox & Gallar	Chart
Quick Report 159	(DOS) 179
dUtil II or III 58	Project 169
Funk Software	Multiplan
Sideways \$ 40	(MS/DOS) (v.1.20) 129
FYI	Word (v.2.0) (DOS) 229 Others Call
FYI 3000 259	Microstuf
Harvard Associates	Crossleik \$ 99
PC Logo \$ 99	Remote 119
Harvard Software Project Manager \$249	Multimate Systems Inc.
Total Project Mgr 279	Multimale (v.3.3) \$265
Lifatree Softwara	Qusis
Volkswriter Deluxe . \$155	Word Plus \$110
Volkswriter	Punctuation & Style 99
Scientific 299	Office Solutions
Living Vidaotaxt	Office Writer Call
Think Tank (256K) \$119	Open Systams Acct'g Prog aa \$379
MDBS, Inc.	Acct'g Progas \$379

Knowledge Man ...\$289

This is only a sample of the nearly 10,000 products we carry. If you're interested in something that is not listed, PLEASE CALL!

#### 1 800 826-1589 wscass 1 800 472-3535

INT'L TELEX: 260181 ORYX SYS WAU
Technical Support/Ordar Status/Customer Servica:
Call (715) 848-1374

Technical Support/Order : Cell (715) 848-1374.	Status/Cusfomer Servica:
MDBS, Inc. (Con't.) K Text	Paachiree Software Beck to Basics Acct'g System \$21 PeachPak 4 (GL, AP, AR) 22 Acct'g Modules 35
MicroPro WS ProPak (WS, CS, MM, Si) \$255 Wordstar 175 Wordstar 2000 255 Wordstar 2000 + 295	Prentica Hall VCN Execuvision \$25 Quadram-Quadsoft Tax Strategist \$20 Investment
Microrim  R:Base 4000 \$285  R:Base Clout (v.2.0) 159  Report Writer 95  R:Base 5000 429	4-1-1 Retrievel Syst. 9 Deadline Mgr 9 Dete Base Mgr 13 Select Write: Wd Proc 101 6
Microsoft Flight Simulator . \$ 39 Chart . 159 MuMath/MuSimp (DOS) . 179 Project . 169 Multiplan (MS/DOS) (v.1.20) . 129 Word (v.2.0) (DOS) . 229 Word (v.2.0) (DOS)	Freestyle
Microstuf Crossleik	Samna + 44  SPI Open Accese : \$31  Satallita Software  Word Perfect w/Sp : \$22  Word Perfect Jr
Word Plus\$110 Punctuation & Style 99 Office Solutions Office WriterCall	Sensible Designs d Programmer \$19 Softcorp, Inc. PRO-JECT 6 Ca

Fancy Fonts (v.2.0) \$135 Sofistyla

Printworks . . . . . \$ 49

	OA
I	Software Arts TK! Solver \$265 Spollight 109
	Sottware Publishing (Jr. Compatible) PFS: File, Graph, Plan, Write, Accessas 89 PFS: Reportaa 79
	Sorcimil.U.S. Acetg. Mod \$399 Supercalc III 259
	Star Software Accounting Pariner \$219 Acctg Partner II 599
	Supersoft Disk Doctor \$ 69 Fortran 309 Other Producte Cell
	Thoughtware Trigger \$329 Warner Software
	(dr. Compatible)

## Desk Organizer . . . . \$129

Mannasman Tally Call
NEC 3550
Okidata 82-93 Ceil
Quadram
Quadjet\$399
Qued Laser - For appli-
cetions that require
fast turnaround time.
Star Micronics Call

Microlazar Stack Printer . . . . 139 DIP SK S/D SK (exp 64K only) .... 149 S/S BK (exp 64K only) Quadlink 64K Mem . 385 Quadboard Silver . . . Call Quadboard Gold . . . Call Quadport AT . . . . . Call Liberty . . . . . Call allette Master (256 colors) . . . . . 499 Quadgraph (mono/graphics) . . 379 Quadview (P.S. CI/Cal, Solt Font, w/Ed Stt) 269 Quadsprint (doubles proc speed PC or XT) . . . . . . . 489 All Other Products . . Call 1st Mate . . . . . . . \$259 2nd Mate . . . . . . 250 3rd Mate . . . . . . . 379

Quadboard 64K, fexp

384K, Clk/Cal, S&P)\$199

Memory Chips Michiga set) 3,25,5 \$ 27

Captein ...... 199

DISKETTES 3M 514" DS DD ox/10) ...... \$ 30

Mayall MD2-HD (diskettaa for IBM-PC-AT, Box/10/\$ 69 Ultramagnetics 514" DS, DD (Box/10) . . . ......\$ 25 Verhellm 514" DS. DD

(Box/10) .....\$ 30 DISPLAY CARDS

Graphics Board . . . \$329

Modular Display \$285

w/Ser Port ..... Baby Blue CPU + ...\$325 Baby Blue II . . . . . 525

BOARDS

PC

NETWORKING

(Please call our

**Technical Department** 

for specific

configurations.)

PC NET I - Coaxial

Configuration w/

PC NET II - Twisted

Pair Configuration

Ethernet Technology -

Versatile PC Network

Various networke for

varied epplications

Starter Kit

w/Starter Kit

**Quadnet Series** 

Quednet II. VI. IX

Omninet - Features

available in 5.5

Meg to 126 Meg

Six Pak Plus 64K (S&F

MegaPlus 64K, (CI/Cal 

Adventage (AT)

DCA

Koala

Herculae

Cik, exp to 384K) . . \$265

Megapak 128K . . . . 245 Megapak 256K exp . . Call Monograph Plus . . . Call

Irma Board ......Call

Color Card . . . . . . \$195

Touch Tablet . . . . . \$ 99

Floppy Drive Cntrir. \$119 w/Par Port . . . . . 169

Maynard Electronica

Corvus Omnidrive

Etherseries -

Quadram

Conus

AST

3Com









#### POLICY:

Sandstar ...

Microlog

- Wisconsin residents add 5% for sales tax. Winimum \$4.00 for shipping, handling and insurance for orders to \$200.
- ▶ For orders over \$200, add 21/1% for shipping, handling
- and insurance. For cash prepayment of orders \$200 or more, add ONLY 2% for shipping, handling and insurance.
- Prices ora subject to change without notice.

► All items subject to availability. PCAD 090385 PCAD 091785



DISK DRIVES

CDC 1800 . . . . . . . . \$159 Corvue HD ......Call Bernoulli Box . . . . . Call Maynard HD . . . . . Call Maynard Electronica Maynatream: Portable back-up for HD System 80 (Incl. 1 cntrir card) . . . . \$1695 Contrir Cds . . . . ea 175 Cartridge 450' ... ea 35 Cartridga 600' . . . ea 45

Mountain, Inc. 35MB HD w/ 27MB tene back-up - or 35MB HD w/ 60MB tone back-up For more info . . . . . Call Half High

Diak Drives . . . . . . Call Taligraea . . . . . . . . Call (Wisconsin customers) Tandon TM-100-2 . . . Call Plus complete line of hard disks

MODEMS

Smartmodem 300 . . \$159 Smartmodem 1200 . 399

Smartmodem 1200R Smartmodem 2400 . . Call Novation . . . . . . . . Call Quadram Quadmodem II . . . Quad 5251 . . . . . . . . Quad 3278 Call

Call . Call US Robotica Password . . . . . . \$325 P22 Stend Alone ... 75 Electronic Protection Davicas Lemon / EC-I . . . . . \$ 38 Lime / EC-li .

. . . . . 55 Orange / EC-IV . . . . File 'n' File 514" ...\$ 22 8087 Chip . . . . . \$149 8087 w/Software . . . 255 80287 AT Chip w/o aft ......... 269 Other Products . . . . Call Kanaington Microware

MONITORS

HX12 RGB Color ...\$475

MAX 12E ..... 179

Quadchrome II . . . . 429 Amberchroma

Quadscreen Hi-Res. 1449

8112 12" HR Green .\$169

Model 420L RGB . . . \$499

Zenith ......Call

III TRA HLBES

MONITORS

x 480 Pxls) . . . . . . \$639

for SR-12 ...... 175

MISC.

Computer Accessories

P12 IBM PC .....\$145

\$149

285

175

300A Amber

500 Clr RGB

Quadchrome . ....\$489

310A ..... Call

300 CH

PGS

Taxan

SR-12 (890)

Alpha-Dalta

Protector

MACC 8 Surge .....\$ 60

Power Directors

Doubler Card

Kay Tronic KB 5151 ....\$189 KB 5151 Dvorak . . . . 169 Microsoft Mouse ... \$139 Mousa Systems PC Mouse .... \$150 RH Electronics, Inc. Guardian Angel .... Call Power Angel (800w) . Call Titan Technologies, Inc. PC Accelerator . . . . Call TG Joystick ..... \$ 49 Touchstone Technology Touchatone II (add-on keypad for

Head Cleening Kit., \$ 16

Varua Computing VersaWriter . . . . . . \$239 CAD

the IBM) ... .....\$189

Varbatim

CORNER Orvx Systems supports Micro-CAD applications Qur technical stall can answer your questions concerning leatures. compatibility and configurations.



Jr. Captern (128K, C.P) \$315 Other Products . . . Call Masterpieca .....\$109

WE WELCOME:

➤ Visa, MasterCharge and American Express. (No charge for credit cards.) Corporate, government, educational or valume purchasers, please ask for special accounts

desk for additional discount. COD (Add \$2.00 per bas/parcel, Cash or certified check required.)

▶ Checks. (Allow 1-2 weeks for clearing.)

INTERNATIONAL POLICY:

We welcome foreign orders. Shipping and handling charges per order are actual shipping plus \$50, in 1 handling fee. Conadian orders — please call. Teles: 260(8) ORYX SYS WALL **WORKING HOURS:** 

Monday-Friday 8:30-6:00 • Saturday 10:00-2:00 • Central Time

Technical Support/Customer Service/Order Status: Call (715) 848-1374

CIRCLE 363 ON READER SERVICE CARD FOR SPECIAL OF THE MONTH CIRCLE 351 ON READER SERVICE CARD



### Oryx Micro Supply CRAFTSMEN OF THE NEW TECHNOLOGY

425 First Street • P.O. Box 1961 • Wausau, Wisconsin 54401

A Division of Oryx Systems Inc.

#### BEFORE YOU GET ON THE WRONG TRACK, READ THIS ABOUT THE ONLY ROM-BOOTABLE, PLUG-COMPATIBLE, XENIX SUPPORTING. HEAD-CRASH PROTECTED, HIGH-PERFORMANCE HARD DISK UPGRADE KIT FOR YOUR IBM PC-AT.



Fall one year war: Service available u

b Park # Lark (AP#I)

Memory option. 18 - 128 Kilabit (150as) D-RAM chip set. Adds 250 KB to PC-AT basic model making 512KB PC-AT. With on AT plass drive, you can build the PC-AT IBM should have built in the first place.

### THE BALANCING

You didn't buy an IBM PC-AT just to balance your checkbook You bought it to crunch lots of numbers and words, in the shortest possible time. A labor saver. A time saver. a money say So, do your part for effe ard disk storage is no place to be penny-wise and pound foolish.

pound toolsth.
TELL EM YOU NEED
HIGH SPEED
AND DATA PROTECTION.
These and other
important features do add
cost, but that makes a m drive. Anything that can be de, can be made saper, sell for less, offer lower performance, and probably die young. Remember, usually you get what you pay for, and you ALWAYS get

#### what you don't. L HARD DISKS RE NOT CREATED EQUAL.

ARE NOT CREATED EQUAL.

There are vest differences in the speed and reliability of Winchester hard disks. Since the IBM PC-AT is an incredibly task machine, a manufacture of the IBM PC-AT is an incredibly task machine, and AT on like an XT on like an XT

THE DATA GOINE?

Now tell em the drive must have a data protection scheme. One that's casy to use and reliable.

Winchester heads read and write while "flying" a few microns above the data surface. If the heads owned the proportion contact the recording media, you risk a head crash, and significant or

total data loss So, even a fast drive without data protection is virtually worthless. Frank-ly, we'd rather sleep at

## night.

BEWARE OF USER-DEPENDENT PROTECTION SCHEMES. Some drives have a safe landing zone for the heads, but you need to call a separate program to send em there. If you don't call that program, and most folks won't, the and most folios won't, the heads in these drives ALWAYS land on data when powered down. The slightest bump or vibration can move the heads, wiping out those data tracks. And the R/W

heads can become contaminated, thus increasing the error rate, slowing down average access until the whole drive

Consequently, those drives offer a very high risk of head crashes, a false sense of security, and little else. What's your data

What's your data worth? \$200? \$400? Specify AUTOMATIC data protection. ATplus has it. And it doesn't cost,

PEACE OF MIND. Specify AUTOMATIC park and lock of the heads on power down.

This system provides unparalleled head crash

protection, by sensing power loss to the drive and retracting the heads to a dedicated landing zone before they can land on your data. Since this is 100%

## automatic, user-dependen risk is eliminated. OUR DRIVES HAVE ALL BEEN TO BOOT CAMP. Avoid drives that CLAIM PC-AT: compatibility but can't BOOT the AT. By the time you juggle the

INTERNATIONAL

diskettes necessary to use one of those drives, the phrase "user-hostile" will have deep personal signifi-

We believe that computers ought to serve people, not the other way around.

around.

BEWARE OF THE BARGAR

BAND SCREPTER.

Avoid drives with inexpensive Band Stepper
positioner technology.
These were pretty good
way back in 1980, considering that's all anyone
had. But by today's standards, they're inaccurate and very mechanical.

and very mechanical.

They waste time looking for the right track to read or write. And they're worth no where near the price you'll pay for 'em -in more ways than one. THE HIGH TECH SOLUTION Specify state of the ar ROTARY VOICE COIL

(RVC) head positioner and CLOSED LOOP SERVO This system uses of DEDICATED SERVO SURFACE (DSS) for

continuous head location information. The RVC and DSS use a large scale microprocessor to translate new current that is applied di rectly to the RVC.

This moves and holds the R/W heads at the exact track intended. Speed is dramatically increased since head movement is created elec-tropically with min-

tronically, with minimal mechanical interfacing BESIDES BEING THE SOLE SOURCE.

Specify names you know and can trust. Like Centrol Data Corporation in hard lisk technology. And ORE INTERNATIONAL a growth company with over ten years in computer technology, design and

ATPUIS: IDEAL FOR THE SPECS MARKAC. ATplus High Performance Hard Disk Upgrade kits, available in 20, 30, 40, 56, and 72 MB capacities.
They have ALL the

above features and non of the shortcomings of "bargain" drives. And your AT will And your AT will accept any two ATplus drives, for up to 144MB of bootable, rehable, DOS and XENIX supporting high-performance on-line storage, all inside the box.

TELL YOUR DEALER....
That only ATplus Hard
Disk Upgrade Kits from
CORE will do. If he or she doesn't have 'em, we'll gladly set them up as ATplus authorized

542 S.E. 5th Avenue • Delray Beach, Florida • 305/276-3929



## **Greater Power**

Advanced Technology. With it, IBM tripled the speed of the PC and increased its memory capacity five-fold. Nowhere is this increase in computing power more important than in networking situations. If the AT's technological advances have prompted you to look into a multi-user network, you owe it to yourself to take a closer look at MultiLink Advanced " . . . a unique multi-tasking, multi-user network-

ing system that runs programs under PC-DOS 3.0. Eight Workstations for the Price of an AT. MultiLink Advanced" represents the next generation in networking systems for IBM microcomputers. The system enables terminals, connected to a single AT, to emulate IBM-PC's having up to 448K of RAM (The PC-Shadow "terminal, shown above, even has a PC look-alike, as well as work-alike keyboard and display).

This means that instead of spending \$3,000 per workstation for a PC with a Kilobuck "Network Interface Board," you can use inexpensive terminals . . . eight of which cost less than an IBM AT. Even if you need only one workstation connected to your AT, you'll realize significant savings.

MultiLink Advanced "... Instant Access to All of Your Resources. Central to most multi-user situations is the need to coordinate a variety of printers. With what's been described by PC-Tech Journal as " ... by far, the best print spooler for the IBM PC," MultiLink Advanced" gives users the option to print either at their workstations, or at a central location. In addition, programs and files can be shared by multiple users locally or through use of a modern. Just think of it . . . having remote access to an AT with a lightweight

Although designed to take advantage of the AT, MultiLink Advanced " runs on all versions of PC-DOS, except 1.0, and certain implementations of MS-DOS. A wide range of leading programs are supported which include WordStar. dBASE III, Multimate, and Lotus 1-2-3

Get the Advanced Story Today. Call The Software Link Today for complete details and the dealer nearest you. Multi-Link Advanced " is immediately available at the suggested retail price of \$495 and comes with a money-back guarantee, VISA, MC, AMEX accepted

## MultiLink

THE SOFTWARE LINK, INC.

rte 632, Atlanta, GA 30338 Telex 4996147 SWLINK CALL: 404 998-0700

Dealer Inquiries Invited

## HOMEBASE

of Alex Morton tere's what noted cunce fiction wester David Gerold wester VP Marketing & Sales about Home base!

You saked for my reactions to the latest version of Formbase, Ok, here goes, But I'm afreid I can't

Company of the state of the sta give you too many suggestions on how to improve it. It's great solution on a superiors of the superior of the the single most independing place of software that I own. It is easy to use and powerful without being intimidating it is definitely one of those flow did I ever get along without thing, programs

I use the calendar and address-book functions constantly, both at home and in my Kaypro 2000 ; were war commander than described out, a publication confidencing, count as coming out and any supply count which I'm travelling. It's like laking my whole office with me, but without the problems of drugging

The note god functions are especially useful What I like the best is that I can just open up a window it around the airport, or trying to get it through oustoms. and \$0 to mark without having to first learn a stable time language. My those are always close at deal of the ware, whichese containing we enter the witness that sundpanees, any career some surpression to the hand and I can give to may content quality. Fig. 81 can posit out to these con any systemic together it is not. must cant tour get up my momentum, a super company to the super company of the super company

There are a lot of only little surprises here, too. There's a terrific starm clock, a set of DOS Services. AMERY NOT ON MANY ARMY ARMY DISPRISED MATERIALS, AND A SAME OR OF REAL ARMY GRADE AND OFFICE AND OFFICE AND OFFICE AND A PROPERTY.

The built-in terminal program ought to be called "an Broadrin Option" because it makes the headsuppay of legind 8 modern grandbase. I give the ease any adopt I can coungitine the slagest any stone it no common examines handlesses confirm on the common set terminal sections of reseases an insert. acutes or manage a makerim massepposter, a more was come arms seames a constructingual was experimented assess expected configurations. And I resulty time the background electronic mail; I defin't know it could be this easy or convenient. I also like being able to just open a small window to listen in on the

To serry that I haven't used the cut and paste function enough to save shout it. Who knows? Maybe Compuserve CB simulation while keeping my other work on screen.

this is the part of the program that I'll base. So what, I still got my money's worth. I hope you sell a milion copies. And you should because the price is unbellerable. As far as I'm worth it, ten times over

The Woold of Sawriet, The Tompile with Tribbles, A Avenue for Men, A Day for Damaston, the classic novel of The Woold of Startest, the Touble with Tirboles, A Matter for Men, A bey for Mammals interiogence. When Martle was One, and a frequent contributor to computer magazines.

WE'VE BUILT A PROGRAM TO PROVIDE FOR YOUR FUTURE NEEDS AS WELL AS YOUR PRESENT ONES.

## NEXT GENERATION

HOMEBASE" BREAKS THE SOFTWARE BARRIER **BY COMBINING** ALL THE RESIDENT PROGRAMS YOU'VE ALWAYS WANTED ... INTO ONE SOLID PIECE OF SOFTWARE THAT LIVES IN YOUR COMPUTER ALONGSIDE WORDSTAR, LOTUS OR WHATEVER

"We like HomeBase. It comes from the next generation of resident utilities."

Paul Freiberger & Phillip Robinson

age Pads—a secretary can keep a separate message pad

Mail-your electronic mail arrives and files itself while you're

- Nate paids—you can have a single, simple notepad, or use HOMEBASES full power to have a series of notebases, indexed, cross-referenced and fully searchable and satable HOMEBASE's features.
- Calculator-desared for smale calculations and complex formulaic work as well s -you can open multiple directories anscreen, move copy, view and even edi files from this powerful feature. And you can get a beginner up and running with MSDOS in just
  - cases-just hit the hothey to treaze whatever software you're warking in, and

ELSE YOU HAPPEN TO BE RUNNING.

- you're ready to find, insert or manipulate data. Hit if again, and you're back working in your original
- Auto Dialer-stores confountion data for each name , even the window size you choose for
- Multiple Phone/Address Directories—asale as many as you like Rolladex\*\* Card Printer-pints your HOMEBASE address book directly anto continous form
- r-create instant entry farms for your HOMEFASE Databases.

them directly into your HOMEBASE Calculator for retant addition

- automatically huns all your screen when you haven't hit the keyboard for a Alarm-a window opens containing your appointment information, and the alarm first ticks, while To turn it back an again, just hit any key Prevents image burn-n.

To-do List-whitelfeward

ion-NOW HOMEBASE can easily be installed by everyone

system for each of a number of people. Fully searchable and sartable, fool

Time & Expense Diary—the easy way to keep out at trouble with the RS

Quickform Terminal-Instant communications, available at the touch of a hotter

minuteer—comb labels from your address back in just seconds

books. And to search across one or all of them, imagine how valuable this can be for a central

#### ORDER YOUR COPY OF HOMEBASE TODAY!

(NOW ... ALL ORDERS SHIPPED WITHIN 48 HRS.II)

For Visa, American Express and MasterCard Orders Cail Toll Free 1-800-538-8157 ext. 824 California 800-672-3470 ext. 824 (Lines open 24 hours a day, 7 days a week) Or fill in this ORDER FORM enclose check, money order or Visa, American Express and MasterCard number. HOMEBASE is available for the IBM PC, AT, XT and True Compatibles. Requires at least 256K (320K or more is recommended) so that it can reside in memory at the same time you're running other programs. CIRCLE 164 ON READER SERVICE CARD

OWERASE 24	9.95 + 55 IO	r snipping c	ana nanaling"				SEND TO:
reck() moneyo	DARW CHAR	More/Cord C	American Speed	Cord #		Bup. D	Cole
ome							
te							
ompany Name .							
ddress							— Amber Systems
ay					State	Zp	1171 S. Saratoga-Sunnyvale Roa
ome Phone (	)			Nork Phone (	)		San Jose, CA 95129

YESI Site licenses are available for companies . . . large and small. For further information on site licenses call 408-996-1883.

WordPerfect 4.0. Our highest marks yet.



A perfect report card, It wasn't necessarily our goal when we added the most recent enhancements to WordPerfect. We were more interested in responding to the suggestions of our users and dealers.

But a perfect report card is like icing on the cake. And it makes us more confident than ever that WordPerfect 4.0 is the most perfect WordPerfect, vet.

#### Easier.

Most WordPerfect 4.0 functions require only one keystroke, a simple press of a finger. And new comprehensive documentation WordPerfect 4.0 represents a makes learning a breeze.

#### Faster.

Document orientation means WordPerfect 4.0 never makes you wait between nages No matter how fast you type. WordPerfect won't slow you down.

InfoWorld

#### Better.

WordPerfect 4.0 includes several features not found on many word processors. Like a 100,000-word phonetic dictionary; multi-page footnoting capability; table of contents and index generation; automatic outlining and para-

graph numbering and a 4.0 network version. Get the word

processor that lives up to its name (and its report card): WordPerfect 4.0. For more

information, see your dealer. Or call or write:

#### SSI Software 288 West Center Street

Orem, Utah 84057 Information: (801) 227-4020 Order Desk: 1-800-321-4566, Toll-free





'PC 2'' Denials	3
Flugeiman Death	3
NGC Report	
	_

## Commodore's Latest Gamble:

## ;01a, Amiga!

BY THE PC MAGAZINE NEWS STAFF

NEW YORK—It's the only personal computer that can run WordStar in one window and play Smoke on the Water through another.

The Commodore Amiga, unveiled lavishly here in July, is a competitively priced, versatile machine. Commodore, often thought of as a manufacturer of toy computers, is aiming its sights between the IBM and Apple markets, fully expecting to take a chunk out of both.

The only prices announced are \$1,295 for the system unit and \$495 for a high-resolution color monitor (although it is compatible with RGB monitors and color television sets). In order for the Amiga to be PC compatible it needs both a software emulation disk and a plug-in component, each to be priced at around \$100. An add-on 5%inch disk drive will also be available, but the Amiga will be able to run PC software in the Data General/One format in its normal drives

A wide range of software will be available from Commodore, along with several third-party hardware and software configurations. In what could be a move to distance the new machine from Commo-

dore's image, the company has not made Amiga compatible with its currently available software packages.

### Take Me Home Commodore is positioning the Amiga to be all things to all

people—a computer to be used as both a home and business machine. However, its selling point to the IBM market seems



nodore's new Amiga personal compute

## IBM Recalls ATs Amid Denials of the "PC 2"

BY VIRGINIA DUDEK

NEW YORK—IBM announced in July that the widely rumored 1985 introduction of a "PC 2" will not take place, letting competitors and computer dealers heave a sigh of relief. According to William Lowe, president of the IBM Entry Systems Division, the machine doesn't even

exist.

At the same time, Lowe also stated that IBM is recalling a se-

ries of PC ATs produced last year because of a defective

chip.
Declaring the "PC 2" a
"mythical product," Lowe
spoke out against widespread
predictions of its introduction
by both industry press and analysts. He said such rumors may
have deterred buyers who
would rather wait for the next

IBM machine than buy one

now. Lowe said that the corpo-

ration would not introduce a

successor to the PC before the end of 1985.

This public denial of the "PC
2" rumor is something of a
break with IBM's low-profile.
closemouthed tradition when it
comes to product announcements. Industry observers,
however, welcomed this willingness to speak out.

Ingress to speak out.

Norm DeWitt of Dataquest
Inc. in Cupertino, Calif. says he
thinks one reason IBM was will
(continued on page 35)

## 3 MINUTE BACKUP\*! FAST FILE-BY-FILE PROTECTION!



Maynard's new state-ofthe-art tape backup system can back up the average 10MB hard drive in just 3 minutes! Protect select files or back up your entire hard drive with a simple command. Offers unmatched efficiency and comes with our industry-leading 1-year warranty. The MaynStream™ is available in 20MB, 27MB, and 60MB, and as an internal unit for the AT.

\*Arruplisms 2 min/57 sec Total files backed up 376 consisting of 10,002,432 bytes Computed on IBM-PC with 512K memory and one 10MB hard disk drive Your actual back-up time may vary

tiBM is a trademark of International Diseases Machines Compaq is a trademark of Compaq Computer Cor poration NCR is a trademark of NCS Corporation





Shaping Tomorrow's Technology 430 E. SEMORAN BLVD., CASSELBERRY, FL 32707 305/331-6402

CIRCLE 158 ON READER SERVICE CARD

#### Commodore's Gamble

to be as a second machine for people who use an IBM PC or compatible at the office.

In its standard configuration, the Amiga has 256K bytes of RAM expandable to 512K bytes internally and up to 9 megabytes of RAM outside the system unit, an 89-key keyboard with numeric keypad, a mouse, and a 880K-byte 3.5-inch drive. It is based on the 7.8-megahertz Motorola 68000 microprocessor and will be bundled with a multitasking Amiga DOS that lets you choose between using a command line or icons. ABasic (a superset of Microsoft BA-SIC), and a tutor program.

The machine also features speech and music capabilities. While presenting the Amiga. head of software development Bob Pariseau said that the two companies wanted the machine to "run some of the older technology for those who want it." He proceeded to run the Amiga's IBM-emulation program, boot up a 51/2-inch PC-DOS disk, and respond to the DOS prompts to install 1-2-3. which appeared to be significantly slower than the Amiga's demonstration software.

#### Dialing for Cynicism Despite months of anticipa-

tion in some segments of the personal computer marketplace, observers of the IBM arena contained their enthusiasm.

"Any new machine will have some effect on the market, says Gibbs Moody, PC analyst sued from page 33)

at the Gartner Group in Stamford, Conn. "But in terms of the total market. Amiga's impact will be small because distribution channels for IBM are so well defined. I don't see Commodore displacing IBM, Compaq, and Apple, which are already entrenched

"You will see Commodore in

the second-tier distribution channel, but it will have no maior effect. Amiya will appeal to the installed base of Commodore 64 users."

"I don't think it will have any effect because it's not completely DOS compatible," says Tim Lord, vice president of research for Johnson, Lane, Space, Smith, and Company of Atlanta "It will have no effect on business machines, but I can't tell you how it will affect the education and home markets."

The hype for the introduction of the Amiga was considerable. even by PC industry standards. Still, the initial demonstration showed that the Amiga has at least a fair chance of living up to this hype and defining its own niche in the current PC mar-

"PC 2" Denials (continued from page 33) ing to publicly deny the rumor is

that it learned a lesson from the PCir dehacle.

Most observers felt that the mythical machine had not really affected purchase decisions that much; nevertheless, they were relieved at Lowe's statement.

This is something I've prayed for but didn't think IBM would do," says Sy Merrin, president of Computerworks in Westport, Conn. Merrin believes the unwarranted speculation did have some effect on sales and that Lowe's statement reflects a new maturity in IBM's marketing stance. Businessland's senior vice-

president, Enzo Torresi, also discounts the effect of the "PC 2" myth on sales, but for another reason. "The customer does not demand that products change this quickly," he explains. "They would rather see stability and an improvement in their investment over time." Torresi sees the basic PC life cycle extended from an estimated 2 to 3 years to 4 to 5 years,

thanks to the proliferation of memory enhancement boards and other PC add-ons.

Do You Believe?

Otis Bradley of Alex, Brown. and Sons in New York hasn't believed in the existence of a "PC 2" for the past several



William C. Lowe

months. "When IBM reduced the price on the XT by 5 to 10 percent, it indicated that the company was trying to move inventory out gradually. Had it had a product in the wings, the reduction would have been more drastic." Bradley adds that he expects a lower-priced successor to the AT in late 1986 and an 80386-based machine out by early 1987.

There is no reason to hold off purchases anymore," agrees Doug Cayne, a vice president and analyst at the Gartner Group in Stamford, Conn. "But basically IBM does have to move users up to a more powerful machine because it still isn't bevond the 640K memory mark. An interim PC is the sort of product IBM needs.

In a senarate announcement. Lowe said IBM is mailing a test disk to all owners of ATs manufactured in late 1984 that contain defective Texas Instrument chips. The disk will identify whether or not the user's AT has a dual adapter card with the faulty component.

The disk runs for about an hour and will indicate if the card needs to be replaced. IBM will do free on site servicing of the defective ATs. Owners with machines bearing serial numbers ranging from 5019001 to 5141250 and from 0054001 to 0146900 will be notified.

# PC Pioneer Presumed

TIBURON, Calif .- Andrew Flugelman, a highly respected editor, author, and programmer in the computer field, has disappeared and is presumed dead by his family.

Flugelman, 41, was on the editorial staff of PC Magazine when it was founded in 1982 He was the founding editor of PC World and MacWorld and, 1 at the time of his disappearance. was editorial director of those publications. In the computer community,

he is best known as the author of PC Talk, one of the first communications programs for the IBM PC. In marketing his program, Flugelman originated the 'freeware' concept, an approach adopted by many other software authors. He encouraged PC Talk users to pass

copies on to friends who were simply asked to send a donation to Flugelman's Headlands Press

if they liked the program and made use of it.

Flugelman had been reported missing on July 8. His 1982 Mazda was found on July 11, abandoned near the north end of the Golden Gate Bridge, Tiburon police, still treating his disappearance as a missing-persons case, found a note in Flugelman's car but say its contents were "inconclusive. A memorial service was held

in White Plains, N.Y. by Flueclman's relatives on July 14. In San Francisco, a service for Flugelman was held on July 19.



## POINTEINC

LOW PRICES TO PROFESSIONALS WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT! ALL MAIL: Conroy-LaPointe, Inc. TO ORDER, CALL (800) 547-1289 TELEX 910 380 3980











BUSINESS BUSINESS UTILITIES HOME & EDUCATIONAL BORLAND, Solehick
Turbo Piecel or Super Keys, et.
Turbo Piecel widdor or BCCI, et.
Turbo Piecel widdor or BCCI, et.
Turbo Piecel widdor it BCCI
Solohio or Turbo Graphics, et.
Turbo Tilbor
CONTRAL PONTI, Copy IPC
CONTRAL PONTI, Copy IPC
CONTRAL RESIL., FOAR Das 5 species
Destroy, FOAR Das 5 species
Central Set (FCXXT)
DRI LOGGI SE (CPIMAR) ANALYTICA, Refex ASHTON-TATE, Framework MICROPRO, Mankings or Spetitis InfoSter Plus (+ Starburst) Correct Star MICRORNI, R Base Series 5000 70 0 110 8 125 8 56 8 3 36 8 120 8 1 SECTION II. R Base Surve 5000 Logaron Accide 5000 Logaron Accide 5000 IR Base 4000 IR Base 5000 CRM 88" (FCXT)
CRM 88" (FCXT)
FUNE 80FTMARE, Sideways
MRE, PC Painthush
LIFEBOAT, Latino C
MICROSOFT, Macro Assemble
BASIC Compiler or C Compile
Business BASIC Compiler
COSOL Compiler
FORTFMAN Compiler
FORTFMAN Compiler
FASCAL Compiler

WordStar (Jr) WordStar (Jr) WordStar 2000 Plus (ospiable WordStar Professional, 4 Pale	\$ 100 \$ 199 SPRINGSDAND, P \$ 105 \$ 109 UNSSON, Pros Ma \$ 505 \$ 295 WARNER, Deak C \$ 405 \$ 285 XANARO, Ability	
CASH-n-CARRY COM  Betal Sales only, is  SAN FRANCISCO — 550 Wash opposite the Pyramoli Beter Washington Street Lot CALL PORTLAND, OREGON — Air R il Highways 217 and 99W CO Is Belgate Plaza, 2 blocks no CALL (100) 641-673.	state 80 to Highway 480, take 1 (415) 982-6272. Fark 217, Tigard at intersection ALL (163) 620-5395.	
CONROY- LAPOINTE CREDIT CAPOINTE One no a Convy-LaPoint onel application from, so I double fair demand primes with crodit card definition fair and territorians	ACONTSI  ACONTSI  STORY ACONTSI  ACONTS	ORDERING INFO & TERMS: put his office the following the fo

CIRCLE 125 ON READER SERVICE CARD

# "The Company Accountant."



Designed for the small business, The Company Accountant works for you, providing the timely and reliable information needed to develop strategies and make good management decisions.

With the GL, AR, AP, Payroll, and Inventory programs that provide over 51 easy-to-understand reports, The Company Accountant handles your small business accounting needs now and in the future.

#### A system to fit your needs The Company Accountant is built to be

flexible with programs that can be tailored to your needs. The programs can be used individually or together, with each program fully explained in the clearly written manual.

The manual reviews basic accounting principles with a comprehensive tutorial, a command and report reference, and a complete glossary of accounting and computer terms.

MPC, XT, AT or true compatible seth 128K RAM intochrome or color monstor; DOS 20 or greater, 2.326K ik draws or 1.326K disk draw and I hard disk, Printer solder of 127 printers.

#### Speed and accuracy The Company Accountant is a fully

integrated system that makes accounting fast, efficient, and accurate. Using the double entry method with complete integration, you only enter figures once. And they are always current as of the last transaction.

On demand, The Company Accountant provides a wide variety of reports, ranging from the familiar balance sheet and income statement to customer and vendor activity, payroll information, inventory values, and stock levels.

#### Double entry, plus...

- · Password security
- · Hard disk support · Capacities limited only by disk space
- · Creates DIF files for use with other rograms Data compatible with:

Rocky Mountain Desktop Accountant

- Insoft Accountant Peachtree PeachPak 4 series Multiple departments, up to 99
- · Customer and vendor mailing labels · Full audit trail and control reports FREE telephone support

#### Great price Now double entry accounting becomes

simple, reports easy and fast, and your bottom line instantly accessible. And at \$395, very affordable

To order The Company Accountant, or for more information, pick up the telephone and call (503) 639-4907 TODAY



12088 S.W. Garden Place Portland, Oregon 97223 or also removed detailed descriptions of

these programs with sample reports by mail. Simply fill out this coupon or attach your business card and mail to In-House Software. Your information will be rushed to you by first-class mail.
VISA, Master Charge & American Express accepted
NAME
ADDRESS

CIRCLE 243 ON READER SERVICE CARD

# NCC's Sights to Behold: Laser Printers and CD-ROMs

National show features lasers that store and print.

#### SHOW REPORT

BY CRAIG L. STARK CHICAGO-Continuing developments in optical storage technology, the emergence of increasingly sophisticated printer options, and a few surprising niche-product introductions were the highlights of an otherwise moribund National Computer Conference held in Chicago's cavernous McCormick Place

front from IBM, NCR, Honeywell, Burroughs, Intel, and Apple and the absence of such major companies as DEC. Wang, Priam, Tandem, Hewlett-Packard, Sony, and Apple all contributed to the gloomy perception that this was simply one show too many. Although OEM participants had more to look at. this show did not have much to

Bad news on the earnings

offer PC users. Perhaps two COMDEX's, one SIGGRAPH. and local expos as needed are about the right dose of computer shows.

Most significant new products introduced, announced, or rumored at NCC focused on laser technology. Most interesting, perhaps, was the prototype demonstration of a 31/2-inch crasable laser disk displayed by Verbatim, now a Kodak subsidiary. The disk employs a combination of thermal writing and magneto-optical reading. The medium is a protected terbiumiron-cobalt layer with a vertical magnetic orientation, pregrooved (spirally) to simplify the servo-tracking requirements. Currently, the disk can accommodate bit densities of 40 megabytes, but up to 100 megabytes of storage could be sup plied by the official 1987 product introduction. Error rate (after correction) will be the industry-standard 10-12, and target pricing is \$500 to \$1,000 per drive and \$20 to \$40 for the

While erasable optical disks.

which can be substituted directly for floppies or Winchesters. are still in the future. WORM (write once, read mostly) optical disks are more immediately

The Alcatel Thomson Gigadisc (\$15,600) and the Optimem 1000 (\$13,600) now

bination printer/copier that sports bit-mapped graphics (300 × 300 dpi in reduced-size pages; 150 × 150 dpi for fullsize), downloadable fonts (up to 22 fonts per page), 10 page-perminute output, serial (RS-232A) or parallel (Centronics) interface, and an optional fouruser interface with additional spooling memory. Diablo 630 and Xerox 2700-II emulation are standard, and Epson compatibility is "under active con-

Ricoh introduced its own laser printer line, headed by the



The new Xerox 4045 Laser CP primericopier

#### Shortcut Allows Lotus Use on EGA

Are you tired of waiting around for Lotus Development Corporation to fix 1-2-3 so that you can use the legendary spreadsheet's graphics on your IBM Enhanced Graphics Adaptor and Monitor (EGA/EGM)? Well cheer up, friends-relief is here, and it's easier to find than your nearest authorized Lotus dealer. Better yet, this help's free to any licensed 1-2-3 user and, unlike some other fixes that have been proposed, it's to-

What is this-black magic? Do you have to be a DEBUG guru to use it? Nope-it turns out that the graphics driver Lotus created for the PCir conversion kit will work if you have an EGA and EGM in your PC. All you have to do is copy a file called IBM2JRKB.DRV from Lotus's 1-2-3 PCjr Installation Kit onto your Lotus system disk (or hard disk) and rename it GD.DRV. After you do that, the next time you boot up 1-2-3 and press the F10 key. your graph will be successfully displayed (your system crashes using the standard graphics driver). It won't be the high-resolution graphics the EGA/EGM combination is capable of, but at least your system won't crash. One difference you'll notice is that the background is blue instead of black. If any of you with regulation IBM Color systems prefer a blue background for your graphics, you might also want to use the PCir driver-it works fine in either -By John Dickinson offer I gigabyte of storage the the user can write to once on a 12-inch optical disk. Both the ATG and Optimem units offer the emerging industry-standard SCSI interface, and Optimem (now a division of Xerox) has recently modified its product to accept both ATG and 3M disk media.

For those seeking a WORM with a slightly less voracious appetite, Optotech introduced its PC plug-in 5984, which stores 200 megabytes per side on a 51/4-inch disk cartridge. While a bit pricey at \$5,000 each, large volume orders will be written for less than \$1,000 per drive.

## Darkness From Light

NCC also saw the introduction of a number of new laser printers not based on the Canon laser engine. Xerox brought forth its 4045 Laser CP, a comtable-top LP4080. Priced at under \$4,000, it's rated at 8 pages per minute, 5,000 prints per month, and offers full-page 300 × 300 dot resolution, serial and parallel ports, four on-board and multiple bost-download. able fonts, and Diablo 630 emulation (for 1-2-3, MultiMate, and WordStar). Users can replace not only the toner cartridges (3,000 prints), but the OPC belts (10,000 prints) as well, saving a service call. To save collating, the printer ejects pages onto the output tray face

ultimately, offered less for the PC user than it did for users of mainframes, minis, and OEMs. Once, it was a computer show dedicated only to these non-PC markets. From the looks of this year's show, it appears as if it is heading in that direction once again.

The McCormick Place NCC,

down.

# CXI is now compatible with what's-her-name.



Thats good to know.
It means the CXI 3278/79 PLUS
coaxial connection is now 100 percent compatible with IRMA." So you can add our
new hardware to your network and run all
the same software she runs. Without
changing a thing.

Not your mainframe application software. Not your PC software. Not even old whats-her-name. So if nothing changes, why go with CXI?

Simple. Our CXI 3278/79 PLUS emulator

Our CXI 3278/79 PLUS emulator

CONNECTWARE is a trademark of CXL Inc. IBN is a registered trademark of International Business fachines Corp. IRMA is a trademark of DCA. Inc. © 1885.CXL Inc. gives you more to work with. You get one host session, one PC DOS session and two notepads. All on the same screen at the same time. No toggling back and forth between sessions. And no wasted effort whatsoever.

Were easy to connect, too. Just slip our 5-inch board into any available slot—even a short one—on your IBM PC, XT, AT or compatible. Attach the coaxial cable to a 3274/76 cluster controller. And start sharing information direct with your mainframe.

You should know, too, all our products are now soft-loaded. Not PROM-based like IRMA. So when it comes time to upgrade, you simply insert a new floppy. Instead of new PROMs.

And that goes for our new 3278/79 STANDARD connection as well. It's feature-for-feature identical to

IRMA. Except for one thing.

It costs up to \$300 less.

Interested? For a brochure about these and other CONNECTWARE" micro-tomainframe solutions, call us at 800/22L-6402. In California, call 416/424-0700. Or write CXI, Inc., 3606 West Bayshore Road, Palo Alto, CA 94303.

We'll make you forget all about old you-know-who.

We don't have all the answers, just more of them.



# **HOW TO LOAD**

PC SYSTEMS	
RM PC	
256K 2 drive monorhome system	\$2196
56K, 2 drive monochrome system 56K, 2 drive color system 56K, 2 drives & 10MB	\$2495
56K, 2 drives & 10MB	\$2695
BM PC/XT	\$2205
SSK, 2 drive monochrome system SSK, 2 drive color system SSK, 2 drives & 10MB.	\$2595
56K, 2 drives & 10MB.	\$2595
BM PC/AT	\$3395
56K, 1.2MB floppy 12K, 1.2MB & 360K floppies, 20MB	\$4795
56K, 2 drive monochrome system	\$1995
56K, 2 drive monochrome system 56K, 2 drive color system 56K, 1 drive, 10MB, monochrome system	\$2595
hese systems are brand new, shipped fully tested and burned in, ed for 90 days AND ARE ALWAYS IN STOCK!	fully warran-
isk about our full line of system accessories to keep your sy utning indefinitely and trouble free. Choose from names lik ficroware, Tripplite and Curtis.	stem up and e Kensington
PRINTERS	
PSON	****
(-60 - 150 cpc narrow carriage dot matrix) (-165 (160 cps, wide carrage, near U.0, dot matrix) (-165 (160 cps, near U.0, seinet type controls) (-100 cps wide carriage dot matrix) (-60 (160 cps narrow carriage color dot matrix) (-1500 (L0 dot matrix w) parallel interface)	\$525
(-80 (100 cps, near LQ, select type controls)	\$275
(-100 (100 cps wide carriage dot matrix)	\$425
(-80 (160 cps narrow carnage color dot matrix)	\$575
L 192 (NEW 160 cps narrow carriage dot matrix) L 193 (NEW 160 cps wide carriage dot matrix)	\$409
L 193 (NEW 160 cps wide carriage dot matrix)	\$519
L 84 (200 cps wide carriage dot matrix) ICEMARIK 2410 (350 cps wide carriage dot matrix)	\$1995
ATAPRODUCTS	
10, 8020, 8050, 8070 (with or without color)	*
OSHIBA	2005
1340 (120 cps narrow carriage LQ dot matrix) 351 (Toshiba's new three-in-one printer)	\$1295
FYAS INSTRUMENTS	
-855 (150 cps narrow carnage LQ dot matrix)	\$699
B-16 + (17 cor parent carriage letter cuality)	1205
R-15 + (17 cps narrow carriage letter quality). R-25 (23 cps wide carriage letter quality). R-35 (32 cps wide carriage letter quality). Q24L (New high speed det matrix)	\$850
R-35 (32 cps wide carriage letter quality)	\$895
LITOH	
tarwriter (40 cos letter quality)	*
rintmaster (55 cps letter quality) sk about C. ITOH's Hot New Line at New Prices!	*
DIABLO 30 API & ECS	\$1995/9
IEC	,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
nwriter P-2 & P-3	*
pinwinter 2050, 3550, 8850.	*
PRINTER ACCESSORIE	
O Cod Charal Sections for MEC DIABLO C ITTO	from \$395
Q Cut Sheet Feeders for NEC, DIABLO, C. ITOH	from \$135
Way & 4 Way Switch Boxes (serial or parallel)	. from \$59
Way & 4 Way Switch Boxes (serial or parallel) MP Parallel Printer Cable	
M Parallel Printer Cable ng King Printer Stands secial Make Printer Cables bloons & Printwheels for most printers.	\$35

PLOT	TERS
AMDEK Amplet II (6 pen Lotus competible plott HEWLETT-PACKARD HP7470 & 7475 (2 pens/6 pens) HOUSTON INSTRUMENT DMP 29, 40, 40-2, 41, 42, 51, 52 in st	*
FLOPPY DI	SK DRIVES
TANDON TM 100-2 (Double sided/double CONTROL DATA (Double sided/double HALF-HEIGHT (PC/XT/AT/PORT/ABLE CC CHOOSE FROM NAMES LIKE SHUGAR	
HARD DIS	K DRIVES
PEACHTREE PERIPHER. P.10/ve (10MB internal/external hard die P.20/vs/M* (20MB internal/external hard die P.30 AT (30MB internal AT compatible i 10 MB internal & external removable W 45 MB tage back-up	sk with auto boot) from \$595 (disk with auto boot) from \$795 hard disk) from \$995 inchester systems
Microreel tape back-up	\$549
EMERALD SYSTEMS	
PC & AT compatible, up to 280MB, wit SYSGEN	
Quickfile 60MB Streaming Tape Back-U Image XT cassetts tape back-up XL (External 20 MB hard disk w/60MB	
XI, (External 20 MB hard disk w/60MB	tage back-up)
BERNOULLI TECHNOLO 20M8 removable media subsystems.	
CIPHER DATA	
XT tape backs up off FDC	
DISKE	TTES
VERBATIM	
Single sided/Single density: Double sided/Double density:	10/\$24 100/\$199 10/\$29 100/\$249
Double sided/double density:	
MAXELL	
High-density AT diskettes	10/359
MULTIFUNCT	TON BOARDS
AST RESEARCH	
AST HESEARCH Advantage (AT compatible memory exp Six Pak w64K (64-384K, serial, paralle MegaPlus w/64K (64-512K*, parallel I/O Plus II (Serial, C/C, opt. serial, par	lansion with options) \$259 bl. C/C, opt. game). \$259 C/C, opt. p.s.g) from \$269 allet, game) from \$135
ORCHID TECHNOLOGY Blossom w/64K (64-384K, serial, para Orchid PC Turbo (adds 8 mhz processo	ltel, C/C, opt. PC Net)\$259 or, multitasking to PC)\$825
QuadMeg (AT memory expansion up to QuadPort (AT senal and parallel, opt MICROLOG	raliel game, C/C, bracket). \$259 0 4MB) \$349 1 more serial) \$125
Little Red Ram (256K memory expans	serial, parallel, C/C)\$445 ion)
TALLTREE J-RAM II & III MUIS	function Boards
СН	IPS
64K (nine chips) \$10	128K (AT RAM) *
8087 (coprocessor) \$125	256K (ir & AT boards) *

DIATTERS

#### OUR POLICY -

- WE ACCEPT VISA, MC, AMEX; No surcharge for VISA or MC.
- COD requires cash or certified check; Company check when approved.
- Allow 1 week for personal and company checks to clear.
- Wiring information available upon request.
   Corporate, Government and Institutional volume.

purchase agreements available.

- Call for exact shipping charges; air shipments take priority.
- 7. If we must split shipment, you incur no additional shipping charges.
  8. All orders shipped incured. No additional shapes.
  9. All orders shipped incured.
- All orders shipped insured No additional charge.
   All products fully warranteed; Some up to 5 years.
   All items subject to availability; Prices subject to

change without notice.

# **UP FOR LESS.**

GRAPHICS CARDS	
IGMA DESIGNS	_
plor 400 (high res color card for PGS SR-12)	<b>F549</b>
SENG LABS	
traPAK (132 col. mono graphics, serial, parallel, CrC) 1 1rzRAM, UltraOISK, UltraSERIAL (options for UltraPAK) DiorPAK (Ultra hi res color graphics)	428
plorPAK (Ultra hi res color graphics).	*
ERSYST  B Board (beautifully clear text on a color monitor)	
IERCULES	-
raphics Card (Lotus compatible monochrome graphics) Solor Graphics Card (Short-slot color card wiparallel) S	319
ARADISE	1/9
odular Graphics Card & Multi-Oisplay Card from \$	299
ST	
eview & MonoGraphPlus (Monochrome Lotus graphs, parallel, C/C)	*
phioPlus (monochrome w/parallel port)	169
raphics Plus II (Monochrome & color w/ parallel, softwara)	299
IJADHAM ladcolor I & II (Upgradeable color cards)	189
ECMAR	
ophics Master (Hi res Lotus compatible color & mono)	•
OLAROID lette (makes color stides from your PC's screen)	395
PROTOCOL CONVERSION	
	_
ST RESEARCH IX, 5251, 3780, BSC, SNA.	
CA CA	•
as (3278 Terminal Emulation)	895
naline, Irmalette, Irmaprint, Irmacom Call our experts for all your Micro-to-Maintrame needs!	•
MONITORS	_
	_
MDEK NG & 2004 (Green or Amber, composite video monitors) \$129.	139
GA (Amber TTL input, non-glara tube)	100
06 & 300A (Green or Amber, composite video monitors). \$129 A (Amber TTL reput, non-plara tube). \$120 UDR 800 (13" 640 & 240 REB witter button, audio). UDR 700 (13" 720 X 480 REB w; 31 mm dot). UDR 710 (13" 720 X 480 REB w; 31 mm dot).	425
LOR 710 (13" 720 X 480 RGB, non-glare, non-flicker).	575
nberchrome (Amber TTL Ingut, non-glara tube) ladofrome HX-12 (690 X 480 RGB w/ 31mm dot)	:
RINCETON GRAPHICS	
SS MAX-12 (Amber TTL input, non-glare tube). SS HX-12 (690 X 480 RGB w/ 31mm dot). SS SR-12 (690 X 480 non-interfaced RGB w/ 31mm dot).	189
S SR-12 (690 X 480 non-interfaced RGB w/.31mm dot)	7
AXAN	
Byision 425 & 440 .  k us to find the right monitoripraphics card combo for your application	*
MODEMS	-
	_
AYES	
yes Smartmodem 300 (external 300 baud, auto answeridial) yes Smartmodem (200 (external 300-1200, auto answeridial) yes Smartmodem (200 (internal 300-1200, w Smartcom II) yes Smartmodem 2400 (external 2400 baud).	419
yes Smartmodem 12008 (internal 300/1200, w/Smartcom II)	279
	619
NCHOR AUTOMATION	
NCHOR AUTOMATION (nalman Mark XII (300/1200 baud at 300 baud price)	
NCHOR AUTOMATION gnalman Mark XII (360/1200 beaud at 300 beaud price) \$ ST ach (Short-stot 300/1200 beaud w/CROSSTALX, self-test) \$	369
NCHOR AUTOMATION nalman Mark XII (300/1200 bend at 300 bend price)	

#### NETWORKING

We carry all the best names including AST RESEARCH and ORCH TECHNOLOGIES. Call our Networking Applications experts to design a co effective device-sharing networked layout for your office!

SOFTWARE

OFTWARE PUBLISHING Pls Write, File, Graph, Report. from \$7	
OF I WARE PUBLISHING PTS WITE, FIR, Graph, Report from \$1	/9
WORD PROCESSING	
AMNA WORO III & PLUS.	
AUITIMATE comes w/spelling checker and bitorial \$26	
IICROPRO WordStar 2000 & 2000 plus \$245/25	166
IICROSOFT Word Version 2.0	~
IFETREE Volkswriter Deluxe w/Textmerce \$18	
VORDPERFECT 4.0 525	27
TORDPENELI 4.0	4
EADING EOGE Word Processor SE	a
PREADSHEETS	
OTUS 1-2-3 \$30	19
ORCIM/IUS Supercaic 3 \$15	úŠ.
	61
DATABASE MANAGERS SHTON-TATE dBase II & III \$295/37	
IICRORIM RBase 5000 \$38	3
IICHUNIM NDESE 3000	
MS SYSTEMS Power-base #25 MYFLO (Free-form database with opt Reportito)	a
ATTLU (Free-form database with opt Reportito)	
IP Concentric Information Processor.	٠
IICRDSTUF Infoscope	*
EADING EOGE Nutshell	S.
COMMUNICATIONS PACKAGES	
IICROSTI IF Crosstalk XVI	36
ERSOFT Smarlerm 100, 125, 400 AYES SmartCom II \$6	ř
AYES SmartCom II SS	
OHIDCE The Source	
OURCE The Source OW JONES All products	:
ON JUNES AT PRODUCTS.	•
ACCOUNTING PACKAGES	
TATE OF THE ART (G/L, A/R, A/P, INV. Others)	*
ORCIM/IUS Complete accounting modules from \$28	0
	•
EAL WORLO Accounting	
PEN SYSTEMS Accounting	
IONOGRAM Onlars and Sense wiforecasting \$13	iù.
RAPHICS AND CAD PACKAGES	-
ECISION RESOURCES Signmaster/Chartmaster	
ecision resourices signmester/chartmaster	2
PS Business Graphics \$25 UTDDESK AutoCAO with or without extensions.	
OTODESK AUTOCAU WITH OF WITHOUT EXTENSIONS	
MSI PC Paint Brush	.0
LANNING PACKAGES	
ECA/TOBIAS Managing Your Money \$12	•
ARVARO Total Project Manager	
ICROSOFT Project	÷
ANGUAGES & COMPILERS	
ORLAND Turbo Pascal & Toolbox	
DICONOCT AS A SOCIAL SO	
ICROSOFT All products	•
GITAL RESEARCH All products ORDTECH dBASE CDMPILER FEBOAT Lattice C compiler and C-lood Smorgasborg \$299/	•
UND EUR OBASE CUMPILER.	•
FEBURI Lamce U compiler and G-rood Smorgasborg \$299/4	,
ITILITY PROGRAMS	
ORLANO Sidelock & Superkey	8
RINTWORKS by Settebyle	

II PC copies protected softwara popular packages). Call for quantity pricing!

FOR ORDERS ONLY

FOR FURTHER INFORMATION

HRS: 9AM - 9PM EST, SAT 12N - 5PM EST.
IBM is a registered trademark of international Business Machines

# PROGRESSIVE MICRO DISTRIBUTORS

7000 Peachtree Industrial Boulevard Norcross, Georgia 30071

### "How did we become the LAN standard in business applications software... With a little help from our friends."

Using IBM PCs, and Macola Financial Software - the micro-standard in business packages - many LAN products currently available are more powerful - and much less expensive - than most mini-computers being sold today. But please don't take just our word for it...

To profit from the powerful features of a Local Area Network in your business. the software that drives it must also be powerful \*CBS Tous looked at many manufac-

turing software packages and found that 'Macola' running on a 'local area network' of microcomputers was the

answer for our Newark, New Jersey Plant. Macola Software has many of the features and functions that you would expect to find only on mini and

mainframe packages. **Ed Weislow** Project Director CBS Tovs

The software must be uncomplicated.

"We had a problem - an expanding accounting department that needed to be computerized. The 'obvious' solution seemed to be a mini-computer. But our CPA firm recommended Macola. Inc. Macola designed a LAN sustem for us using five IBM PCs and only the software we needed at the time. We saved considerable money choosing micros over a mini, and because of the ease of loading and operating (Macola Software seemed to go on-line overnight), we're still saving moneynot to mention time and headaches The toll-free technical support line has proved invaluable.

We look forward to adding more integrated packages to further streamline our workload."

Donna Griesemer Assistant Treasurer Spic and Span, Inc.

And, of course, the software must be

"When we decided to computerize our accounting, we evaluated various mini-computer systems and found them to be cost prohibitive. We consulted Price-Waterhouse for an

alternative. They suggested a local area network.

After a thorough investigation we selected Macola Financial Soft-

ware running on the Novell Netware/ S-Net

linking six IBM PCs. The sustem meets all

our needs for a fraction of the cost of the mini-computer alternative

Robert F. Steel President

K. A. Steel Chemicals, Inc. Macola Financial Software was converied from the Mini-Standard software of MCBA, the leading independent developer of off-the-shelf business appli-

cations packages. Available now in RM and Micro Focus Level II COBOL for 16-bit computers, it retains all the features-like full file and record locking support - developed for the mini-computer.

Local Area Networks can today run this LAN-Standard manufacturing. LAN Systems Supported by Macola NetWare/Local Area Network

= 3Com's EtherLink NW/G

= Gateway Comm's G-Net with NetWare G

NW/D = Davong's Multi-Link NW/S = Novell's NetWare/S NW/O = Corvus Systems

OMNINET NW/N = Nestar's PLAN 2000 NW/PC = Orchid's PCnet

NW/P = Proteon's proNET distribution and accounting software in

the following packages... Accounts Receivable (A/R), General Ledger (G/L), Accounts Payable (A/P),

Inventory Management (I/M), Assets and Depreciation (A/D), Customer Order Processing (COP), Bill of Material Processor (BOMP), and Report Writer (R/W).

At Macola we feel running-is-believing™ so we've set up toll-free lines for you to ask us how to handle your LAN needs as we've handled them for our friends above. Dealers, VARs and System Integratorsthe modular flexibility of Macola Software allows you to provide your

clientsfrom the singleuser to the business

We're in Spanish, too that needs a multi-user systempackages that can be added as

disco rigido Soluciones ad Opera en PC-DOS MS-DOS your client's \*Available so need and

cash flow allows. They'll love that! Give us a call

1-800-468-0834 Continental U.S.A.

1-800-468-0833 In Ohio only



FINANCIAL SOFTWARE P.O. Box 485, 181 South Main St. Marion, Ohio 43302 CIRCLE 263 ON READER SERVICE CARD

Payroll (PR) Purchase Order (P/O) CBA is the registered trademark of Mint Computer Bossimon Applications, Inc. MS DDG is the registered trademark of Mint Computer Bossimon Applications. Inc. MS DDG is the registered trademark of Exercised Computer International C

#### COMMUNIQUES BY CHARLES BERMANT

#### Squealing Wheels

PCs can now be used to keep track of any immoral shenanigans that may be taking place in a company car. That is, if you think filing false expense reports or repair bills is immoral. J.S. Wendt N.A. 's Transcom System includes a small recording module that is easily installed into a car. It records mileage, maintenance, and ex-

and the operator and then a software package converts the data to the PC environment, where it can be manipulated by other popular business software pack-

ages. A company spokesperson says that the \$648 combined package will pay for itself in 9 months by the elimination of false mileage charges on company cars alone. In the event that a company's representapense data for both the vehicle tives are totally scrupulous, the

unit can save processing tim If you want to increase the efficiency of your car flect, write (don't drive) to J.S. Wendt



#### Cheese Danish

Danish International, a new software manufacturer based in San Mateo, Calif., stands behind Exact, its product for the creation of expense reports. At least we think it does. The program's "limited warranty" reads as follows: "The program is provided as is without warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchant ability and fitness for a

#### particular purpose.

"Danish International does not warrant that the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error free. However (we) warrant the

diskette on which the program is furnished, to be free from defects and workmanship under normal use In other words, the company guarantees there is a diskette in

#### Hackers Don't Invade Computers, Computers Invade Computers

Maybe the muggy July heat got to him, but after several backers were arrested for invading government computers in Middlesex County, N.J., Prosecutor Alan Rockoff's jurisdiction, the New York Times quoted him as saving, "This is a hydra. We have an electronic genius that is the computer itself that gives the mind of man the opportunity to steal and to gain access to other

people's property." And we thought computers were supposed to help mankind, not help mankind help himself to others goods.

#### Bring Us Your Rolls, And We'll Give You a Phymouth Valiant with Three New Tires Software Publishing, of Moun-

tain View, Calif., thinks its PFS:PLAN is so much easier to use than Lotus's 1-2-3 that it is making an offer that few people will be able to refuse. Any confused Lotus user need only send in the program disk from the \$495 package plus \$20 to receive a new copy of \$140 PFS: PLAN

#### Ahoy, Thar' She Downloads!

Researchers at Marineland in Palo Verdes, Calif., are using a PC to gather data about killer whales with the eventual goal of making the leviathans computer literate

Orky and Corky, the only breeding killer whales, or oreas, in captivity, will help us communicate with our mammal cousins by way of a PC-XT donated by IBM. As the project develops, the researchers hope to develop graphics to represent the whale's activities. Once the oreas learn to differentiate the symbols, they will be able to communicate with the computer, perhaps through a lever or keypad device.

(A mouse would drown.)

the package.

#### says that a computerized record will help predict behavior patterns, with the IBM system giving the whales the eventual option of requesting contact with a trainer. He goes on to say that an orca's sound "differs in work and nonwork situations." We can't wait to hear the sounds Corky makes when she learns Desk Organizer.

A Marineland spokesman



Abraham Mudrik, a Canadian PC user, writes that when he attempted to remedy an annoying squeak from his Epson printer, the company told him that he'd have to special-order a custom lubricant for \$7.50 a can. The intrepid Mudrik found a better solution-trumpet valve oil,

Yes. We Get Letters

Send your contributions to PC Magazine, One Park Ave., New York, NY 10016, (212) 503-5276, MCI Mail 157-9301. We pay \$50 for each Communiqué used, though we only sent Mudrik \$37.



✓ Tougher
✓ Quieter
✓ Smarter
✓ Thriftier
✓ Easier
✓ Quicker
✓ Finer
✓ Cleaner
✓ Sharper
✓ Sturdier

☑ Abler ☑ Prettier ☑ Slimmer ☑ Trimmer ☑ Friendlier



## **☑** and smaller.

The new Okidata Microline 192 does everything the bigger, bulkier printers do. And more. But in a much smaller space.

It's easier to operate, too. With push-button menu select programming, so you never have to touch a DIP switch to set fonts, line widths, underlines

It's compatible with your computer. Just plug it in and put it to work, without changing control codes. And, it's compatible with you. Long-life cartridge ribbons pop in and out without so much as smudging a finger.

Super-quiet operation and super-fast bidirectional throughput make the new Microline 192 one handy printer to own. All this, plus our full one-year warranty (try to find that on most printers), makes it the only one you should own.

you should own.
The new Okidata 192 and the wide-column 193.
Simply stated . . . better.

For more information, call toll free 1-800-OKIDATA.



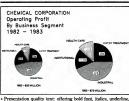
We put business on paper. CIRCLE 285 ON READER SERVICE CARD

# CHART-MASTER™

The Number 1 Choice for Business Graphics Software.

# 800-SOFTWARE

## The Number 1 Choice for All Business Software.



- color and left justification.
- · Highlight a single letter, word or line.
- Select proportional pies. Up to 4 pies per chart, 20 slices per pie.

CHART-MASTER gives you more ways to present information to an audience than any other package on the market. And we do it with style and ease. In fact, we're the number 1 choice for those who use business graphics software on IBM personal computers.

Whether you need CHART-MASTER or other popular business software, we urge you to call now for your free copy of "A Buyer's Guide to Discount Software."

It's filled with important information about 800 SOFTWARE's National Account Program and how it can go to work for volume software purchasers.

# **DecisionResources**

Software Designed for Decision Makers

Companies like Coca-Cola, Proctor & Gamble, GTE, and hundreds of others have already learned that 800 SOFTWARE is the smart way to buy.

Why? Because our National Account Program offers volume software purchasers more than just low prices. It also offers fast delivery, technical support, full training capability, and the personal service that has made us one of the nation's largest suppliers of business software.

No matter what software your company needs, give us a call and get your free buyers guide.

We want to show you why some hard headed business people buy their software from us.





00-225-9273 300-872-286

940 Dwight Way, Berkeley, CA 94710

# "Fundamental analysis program. Yields some pleasant surprises."\*

Projects Earnings and Dividend Growth Rates. Establishes Bur and Sell Screening Criteria Calculates Total Return for Drtferent Economic Criteria, Measure Financial Health of a Company. Establishes Risk-Reward Relationships

► Tutoriat The Compustock program and manual are designed to be used as a tutorial for those who have not previously invested in stocks. Examples are given in the manual and provided on diskettes so that new investors can get practice in the methods of evaluating real stock situations

- Fundamental analysis Compustock is a powerful tool for analyzing Stocks by fundamental analysis. Graphics establish easily recognized financial trends. Color signals (or monochrome highlights) indicate areas of strength and weakness in a stock. Flexibility of input allows the user to input varied economic and financial criteria to determine the effect on a
- ► Necessary equipment The program operates on the IBM, XT, AT, PC or PC Jr (with Basic Cartridge) and the Compaq with 128 KB Memory. A printer is desirable but not necessary.
- The operating system is DOS 2.0 or later, Graphics Card Required

# Doptional subscription service An optional follow on subscription service is ible with pre-screened stock data on diskettes mailed monthly to subscribers COMPUSTOCK

AS GIBSON 8 SONS

the product did more than the authors said it could do Compostock is more than any investor will need to do fundamen

Wall Street Computer Review, March 1985" tal stock analysis

"Compusions is an excellent fundamental analysis package for the intestment community. The software quickly computes crucial one interactions community in advance of the conference in addition ratios, draws graphs and sets target price objectives. In addition to the software the company provides a concise yet clear user's

Edward Bowman, Pres., MarketBask-Metuchen, New Jersey The program is entirely menu driven which allows the user to nor processor to encourage motion unique months among the upon to travel freely from one program countrie to another. The program

makes excellent use of color to highlight various economic conditions and assumptions. . , the documentation is well written and easy to understand ... I think you will find this program to Computerized Investing Magazine, May/June 1985 (American Association of Individual Investors) be of value.

"Compostock is a competent and fast, yet thorough, stock composition is a composition and read, are construction storing quality analysis program balloted for intelligent investor's seeking quality Peter M. Ruphash, President, Final Tech Consultants

An incredible package.

An unbeatable price.

A.S. Gibson & Sons Inc. and Dow Jones & Co. join in presenting

special offer.		De maio - Deise
COMPUSTOCK™		\$59
COMPUSTOCK investor's Service (1		
Dow Jones News/Retrieval*		***
l hour News/Retrieval usage*** .		
TOTAL VALUE		\$236
PACKAGE PRICE		\$59

"COMPUSTOCK Investor's Service is purely optional and is not required to run ICOMPUSTOCK

CIRCLE 110 ON READER SERVICE CARD ..... DEMONSTRATION -

See your computer or software dealar or mail to A.S. Gabson & Sons, Inc., P.O. Box 130, Bountiful, Littur 84010 My payment is enclosed Please charge to Credit Card No .. \_\_\_ Exp Outr \_\_ American Express Name (print) \_ □ MasterCard Phone No 801 298-4578 Address ....

City/State/Zin Type of Computer Utah residents add 6% sales tax-Add \$20.00 shipping outside of continental U.S.A. COMPUSTOEX Program without Tutonal Orskette Complete COMPUSTOCK Program . . . 

<sup>&</sup>quot;Modem required for Dow Jones Service.

<sup>\*\*\*</sup>News Retrieval is a registered trademark of Dow Jones & Co. Inc. Compusitors is a useful tool in assisting the user to understand risk return possibilities. Ultimately however, the user must choose a stock based on his or her own assessment of the



# Turn on, access, and turn off your microcomputer. From anywhere.

#### PRESENTING TURN-ON"

TURN-ON is a totally unique intelligent power controller the provides unattended remote eccess plus power pretection to your intercompitation. Now the pretection is your intercompitation with the pretection to your intercompitation will be schedules or peak hour overloading, when the phone rings at your poweredown miton. TURN-ON eutometically overer-up the peripherabil and then the operation, and upon completion powers down the system leaving or visual signal that remote activation has occurred. Your or standed all the time.

#### THE MOST FULLY-FEATURED DEVICE OF ITS KIND

TURN-ON has all the finest available telecommunications features and much more. It is available as a turn-key hardware/software system that goes far beyond power strips and other remote

eccess devices. TURN-ON gives you eutometic log-on 3 phase security:

\*\*User ID\*\* Password protection\*\*

\*\*Optional dial-back confirmation.

\*\*TURN-ON's file transfer program elso

provides transfer protection by file name. The Open-state software permits eutomatic recording of every incoming modern connection by user (it.) tells you which program the user executed, and the time and else of the cult. TURN-ON's software is very user friendly, manucontains is very user friendly, manusort debox compatible. AC lime filtering gives complete power surge protection or all device sorpatible. AC lime filtering gives complete power surge protection or all devices purgoed into the six power cutiest. No separate power strip is needed.

#### TURN-ON PUTS YOU IN CONTROL

Remote distributed micros are now available to you 24 hours a day for such tasks as electronic mail, transferring CIRCLE MS ON READER SERVICE CARD programs and deta files, or the running of other application software. An optional 25 pin connector allows the computer to stay on past phone hangup or manual power-off, so any required processing can be completed.

With TURN-ON, you'll save time and money because you now control and manage the exchange of information with your computer in the fastest, most efficient way possible.

Call today for more Information on how easy it is to Turn-On your computer system.

PC DOS is a registered tradement of international Business Machines Corp. Turn-On and Duna-tisk are tradements of Dynasisch Computer Power, Inc.

# Dynatech COMPUTER POWER, INC.

4744 Scotts Valley Drive Scotts Valley, California 95066 408/438-5760 ■ 800/638-9098



It's hard to believe.

People who wouldn't think of shoplifting a software product on their lunch hour don't think twice about going back to the office and making several illegal copies of the same software.

Making unauthorized copies of software is a violation of Copyright Law. Yet, the problem has reached epidemic proportions because many people are unaware, or simple choose to ignore the law. The software industry is urging decision-makers and software users to take steps to stop ware piracy in their organizations. In the meantime, the indutry has been forced to prosecute willful copyright violators.

There are legal, moral and economic imperatives forbidding theft of copyrighted software.

There is a free pamphlet on the subject. Call or written copy. A copy. A copy. A copy for everyone you know Please ask for Priscilla.



ADAPSO 1300 North Seventeenth Street Arlington, Virginia 22209 (703) 522-5055

# Don't buy a disk/tape system that can't grow with you.



# Get the Sysgen" XL" expandable hard disk and tape back-up system.

Most popular disk/tape systems offer 20 Megabytes of hard disk, plus a 20-Megabyte tape back-up.

That may seem a male now but do you know whether a year

That may seem ample now, but do you know whether, a year down the road, 20 Megabytes will give you enough storage? You don't. So it makes sense to get the *only* disk/tape system

that gives you room for expansion later on.

And that doesn't cost you any more now.

The new Sysgen XL comes with 20 Megabytes of fast, reliable hard disk storage, a built-in 60-Megabyte tape for fast, reliable back-up, plus room for an additional hard disk drive.

What happens if you later need more hard disk storage?
With the XL, you simply add a second 5½" disk drive. It fits
inside the cabinet, and plugs right into the XL controller.
You can add an additional 20 Megabytes, and back-up with
a single pass of the 60-Megabyte tape.

Or add up to 100, and back-up with two tapes.

With the low cost of hard disk drives, expansion is much

more economical than buying a whole new \$3,000 system. Plus, you save desktop space by expanding inside the cabinet.

The XL sells for \$3,295, including cabling, host adaptor,

and utility software. You get everything you need.
(Watch out. Some companies charge extra for cabling and
the host adaptor.)

Installation? Just snap in the controller, plug in the system,

install the system software, and you're running.

Compare before you hay:

You'll find the XL to be the outstanding disk/tape system for

your PC, XT, AT<sup>re</sup>, or compatible today. And the only system that can expand for your needs for tomorrow.

Telements Syege, XL—Syege, Inc. AT—International Business Machines, Inc.

SYSGEN 47853 Warm Springs Blvd., Fremont, CA, 94539
INCORPORA TED (415) 490-6770 Telex 4990843

# Printer Testing in Perspective

PC Magazine's 1985 printer issue reviews only new printers, no matter how good the old. This policy may cause a run on last year's special issue, but it's the best way to serve you.

ere we go again. Last November, we published the largest consumer comparison test ever when we released our findings on 120 printers. Now we're back with another issue covering 70 printers, all newly introduced since our last test.

Aside from displeasing a couple of curmudgeonly readers who couldn't stand to see PC Magazine devote even a single issue entirely to one topic, last year's printer roundup was an unquali-

I feel even better about this year's endeavor. After all. PC Magazine really has only two objectives: evaluating products and making you more productive. When the topic is as big and important as printers, we can't just put a toe in the water. We've got to go for broke, give it all we've got. We're especially proud of the way the comparison table in this issue is organized; it includes a maximum amount of useful information in a minimum amount of space.

We may have created an enormous problem, however, for our back-issues sales people. You see, none of the printers reviewed in last year's issue are in this one, on purpose. We tested 70 new printers, which are the manufacturers' best shots at the state of the art. Many makers have achieved remarkable price/ performance ratios, as well.

Some important printers, however, are not represented here, some that are standards to compare others against; the HP LaserJet, Centronics's GLP, the Toshiba 1340, Epson's ubiquitous FX-80, and the Qume Sprint 11/55 Plus all loomed large in the minds of our review-

ers. We could have retested these machines, but at the expense of reducing our coverage of some new machines. It would have been hard to draw the line-how many oldies should we include?



What's New?

So we let discretion be the better part of valor and stuck to the 70 new printers. A large number of you, though, never saw our first printer issue. We sold perhaps 200,000 copies of that issue, while we expect this one will sell well over 300,000. What will that do to demand for last year's issue? We can only guess.

Maybe it's high time to do a paperback book comparing all the printers currently in production, plus some of the classics. such as the NEC 7700 series. We could roll in all the printer buffers, sharers, and software under one convenient cover. If you're interested in such a project, let me

By the way, this issue holds the record

for the second largest consumer product test, after our first printer issue. Our Project Database is third, with 66 products, and Consumer Reports keeps its hold on fourth place with 60 shampoos.

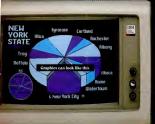
That first printer issue is a record holder of another sort, too. It's as big a thief magnet as a Corvette in Manhattan. I wish I had a photograph of the copy I saw in a large corporate data processing department. Someone had drilled a hole through the upper left corner and put a ringbolt through the issue. It was chained to a desk. Although the measure seemed extreme, I took it as a compliment.

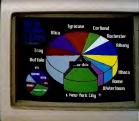
#### Getting Through

One of the most frequent questions we get is, "How do I submit an article to PC Magazine?" We're always open to new writers and new ideas, but just writing and sending us an article is not likely to prove fruitful. Most of what we get over the transom is simply not on target for our readership.

Here's a profile of our readers that will help to orient you: Most (about half) of our readers are business and professional users of PCs. Relatively few consider themselves to be beginners. Most know more than enough about the machine to get by, and nearly 20 percent consider themselves to be power users. Nearly a third of our readers work in a data processing department. They recommend PC-based systems and software for use throughout their companies. They also develop software on PCs and do the jobs that require the agility of a personal computer. Fifteen percent are systems integrators, value-added resellers, or dealers. Everybody programs: 60 percent of

# With ASTA Little More Money Buys You A Lot More Color





The Graphix Partner™ with a standard color card

Announcing the more colorful color card—Color Graph Plus. Dort settle for dull, lifeless 4 color graphics. AST's ColorGraphPlus color card offers up to 16° sharp, vibrant colors in the standard 320 x 200 resolution—For about \$50 more than you'd expect to pay for an ordinary color card.

In the highresolution 640 x 200 mode, ColorGraph-Plus gives you up to 4† full colors. Other color cards offer only

black and white.

There's more, ColorGraphPlus features our memory

expansion option—allowing you to add even more colors—for up to 8† vivid colors in the high-resolution color mode. We've also included a Parallel Port

as standard on ColorGraphPlus, making printer and plotter connections easy and convenient. And there's a software switch, providing compatibility with our Preview!" graphics card.

Complete IBM' color card compatibility. ColorGraphPlus runs all the software designed for IBM's color card in the same resolutions, with at

ard in the same resolutions, with at least as many colors.
And many of those application programs already support ColorGraphPlus' additional color capabilities including

bilities, including some of your favorites like Symphony" by Lotus," PC Draw," Graftalk," Business Graphics Systems," Graphix Partner—as illustrated above—and many others

Graphics Systems, "Graphix Partneras illustrated above- and many others. AST-number one in PC enhancements. Because ColorGraphPlus is from AST, you're guaranteed first class quality, service and support for evolving color standards. Extensive The Graphix Partner with AST's ColorGraphPlus"

testing and comprehensive burn-in procedures ensure the product satisfaction you expect from the industry leader. And each ColorGraphPlus card is backed by AST's one year warranty An optional two year warranty

is also available.
To get the most color from your display monitor call our Customer Information Center (714) 863-1333. Or write, AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714 TWX: 753699 ASTR UR.

Number of displayable ceitors is software dependent.

Coinclingh Fas and Previous Instensión of AST Research in: The
Copiest Pressure destandent of light plant Booken and Company (3st III)
registered tundensión of inspirable Booken and Company (3st III)
registered tundensión of institutional Routines Machaines, Symphoty
Date tundensión of Micrografia framentes Copiestes Symen tendensión
of this three Software Ins. Cantalis trademand
of linching Goods and





our readers do some programming. The most commonly used language is BA-SIC, while Pascal is second, and C is something of a distant third. FORTRAN remains surprisingly popular. APL is gaining in popularity, but our readers still don't have much use for COBOL on a personal computer.

Our readers have come to depend on our particular brand of comparison reviews. Many of them have told me that they'd just as soon not see feature reviews of single products, unless the product is sufficiently unless as to not re-

Our writers are professionals. Most have published books on computer-related topics. Many are proficient in multiple fields.

quire comparison. Furthermore, they want us to draw conclusions. That's why virtually all of our feature articles are product comparisons, replete with charts, tables, and graphs.

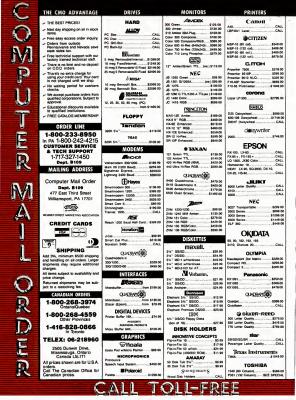
At the same time, our readers demand to be kept current. We do that with the PC News and Reviews in Brief sections. Staff members and control time to the sections, small by to ensure consistency of style and point of view. So while I won't encourage you to submit news stories and minierviews, we re-endlessly interested in hearing about the new products and developments that you consider important of the products and developments that you consider important of the products and the products are products and the products and the products are products and the products and the products and the products and the products are products and the products and the products are products and the products and the products are products are products and the products are products are products and the products are products and the products are products are products are products are products and the products are produc

#### Credentials

We'd like to know something of your credentials, too. Our writers are professionals of one stripe or another. Most have published books on computer-related topics. Many are proficient in multiple fields. Contributing editor Winn Roseh, for example, is a homegrown wir-and-solder electronics wiriz, author of several books, and a lawyer, to boot. of several books, and a lawyer, to boot. have to be a masochist to test computer several Morgan sports cars. You don't have to be a masochist to test computer hardware and software, but it helps, Other contributors are multilingual, both in spoken and computer languages (come to think of it, I heard one speaking dBASE from someone we then day). Most do what they write about for a living. That fact is important more than you do.

for you as a reader. You're trying to get a job done, and you want the straight scoop from someone who speaks your language—and who knows as much as or more than you do.





### TOSHIBA

3-IN-ONE



#### SOFTWARE FOR IBM

Electronic Deak \$199.00 WordStar 2000 ASHTON-TATE WordStar 2000+.... Framework \$399.00 

BORIAND MCROSOFT Sitekick \$39.99 MultiPlan \$129.00 Microsoft Word \$229.00 Continental Software 

MICROSTUF 1st Class Mai ...... \$79.99 artmaster......\$259.00 Signmaster \$179.00 Multi Mate 5249 m

ELECTRONIC ARTS Ger Organized 589 99 Cut -n- Peete \$39.99 PeechPack (GLIAPIAR) \$190.00 One on One 129 00 

EMERTHONICS RESEARCH Energraphics.... \$259.00 \$79.99 Report. \$74.99 # Harvard Software Inc.

Plan 579 99 rvard Project Manager......\$209.00 nase (Date Base)...........\$199.00 RoseSoft
 RoseSoft

Human Edge™ \$89.99 .899 99 Communication Edge..... Software Arts Management Edge. \$119.00 TK/Solver (BM). \$249.00 non Edge....... \$139.00 Sales Edge \$119.00 PC Paintbrush \$54.50

ITFOCOIN Accounting AP/AR/GUINV/DE ...... (ee )\$295.00 Enchanter \$29.90 EasyWinter 8 System \$195.00 Planerfelt \$29.00 Super Project. \$195.00 Hoch Hiker .... 

Word Perfect LIVING VIDEO TEXT Sell, Sell, Sell.

Training.... \$299.00 \$299.00 Application \$179.00 meca: 

IRM PC IBM PC-II IRM-XT IBM-AT

SYSTEMS Configured to your specifications.

Cell for the price end evellebility of your system requirements.

Sefari (7300).... CALL 6300.... CALL

ITT 256K, 2 Drive System.......CALL 256K, 10 meg Herd Drive System CALL

@ SANYO MBC 550-2 Single Drive.... ... \$639.00

MBC 555-2 Dual Drive ...... \$969.00 675 Portable CALL 550 Deskipp CALL

ACCESSORIES

4164 RAM Chips \_\_\_\_\_(eq.) \$1.79 

KEYBOARDS key tronic KB6150/KB5151/KB5151Jr..... CALL

KB5152B/NB5153/NB5148Jr.... CALL

\$229.00

\$599.00

\$399.00

\$299.00

\$379.00

\$800.00

Six Pack Plus 

Graph Pak..... MonoGraph Plus..... Preview Mono..... PC Net Cards

3780 \$639.00

dea IRMA 3270.... RMA Print =SEVEREX-

Color Card (Graphics Edge)....\$299.00 Magic Card \$199.00 HERCULES Graphics \$299.00 Color \$169.00

MEL SECTION IDEAmax - ZPR, 64K, C, S, P.\$229.00 \$289.00 IDEAminimus - MPR 128K ...... \$229 00 IDEA 5251.....

CIRCLE 161 ON READER SERVICE CARD

corona PPC400 Duel Portable.......\$1799.00 PPCXT 10 meg Portable.......\$2399.00

PC40022 10 meg Desktop .... \$1999.00 PC-158-21 Single Desktop...... CALL PC-158-52 Dual Desktop.... CALL PC-158-53 10 meg Desktop.......CALL PC-161-21 Single Portable..... CALL PC-161-52 Dual Portable..... CALL CALL Z-200 (AT)..... CALL 171 (Portable). 138 (Transportable) CALL 

Master Piece Plus... Diamond SP-1.....

\$129.00 530 00 Errerald SP-2 .\$44.99 Sapphire SPF-1. 150.00 Ruby SPF-2..... 580.90

MULTIFUNCTION CARDS

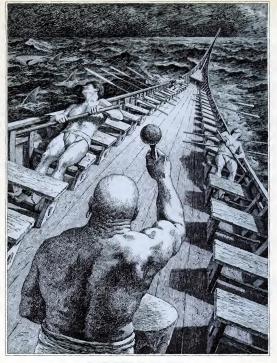
PERSYST Bob Board......\$369.00 PARADISE Modular Graphics Card........\$274.00 Multi Display Card.......\$219.00 

E) SIGNA Color 400 ..... . \$579.00 HOME R Captain - 64 \_\_\_\_\_\_\$189.00 Captain Jr. 128K.....\$299.00

QLW2BAM( 

Expanded Quadboard ....... \$219.00 Liberty \$309.00 QuadLink ..... \$399.00 QuadColor \$199.00 QuadJr. Expansion Chassis... . 8469.00 Expansion Chaseie Memory... \$199.00 Chronegraph.... 579 90 

\$229 m



COMMON SENSE IN DATABASE MANAGEMENT NUMBER THREE IN A SERIES.

## IT'S BETTER TO HAVE MORE POWER THAN YOU NEED THAN NOT ENOUGH.

here's a funny thing about database users. A lot of people buy a program that has all the power they need to get started. And not a whole lot more.

Well, that makes perfect sense. If you plan to stay in the same place all your life. But as most users get the feel of things, they want to push themselves farther and farther. That's when they wish they'd bought a program that had some extra muscle. And if you look at this chart, you'll see that's the whole idea behind R-base ™ 5000

> DBMS POWER R:base 5000 vs. dBASE III

	R:base 5000	dBASE III
Comprehensive procedural language	Yes	Yes
Bult-in application compiler	Yes	No
Choice of row or column report format	Yes	No
Accessible tables per report	40	10
Number of relational operators	6	2
Password security	Yes	No
User-definable data entry rules	Yes	No
Automatic key index maintenance	Yes	No
D . b .	M	

#### THE KIND OF POWER THAT'S EASY TO HANDLE.

We made R:base 5000 so easy to use that a complete novice can develop applications with it right off the bat. But that's just the beginning: we've built in a whole arsenal of high-powered development tools that the most intense programmers can't outgrow.

To give you a better idea what this extra power can do, just take a look at one feature. With R:base 5000. you get a relational operator called SUBTRACT, which dBASE III doesn't offer. By using this command, you could take all the names in one file (such as your customer list) and subtract them from any other file (like the Fortune 500). The result? An instant list of new business opportunities. And this is only one way to use one of the extra capabilities on this chart, there are literally hundreds more.

#### SEE FOR YOURSELF: 1-800-547-4000.

If you believe in common sense as much as we do, you won't take our word for it; you'll get your hands on a copy and see for yourself. And that's just what we'd like you to do. For only \$9.95 (plus shipping) we'll send you a mini-version of the product that lets you build real applications.

lust call 1-800-547-4000 and ask for Dept. 816 . From Oregon, or outside the U.S., call 1-503-684-3000, Dept. 816. We'll send your copy right out. If you'd like to see R:base 5000 today, head straight for a leading store or computer dealer

And see how far you can go when your DBMS has all its oars



R:BASE 5000 FROM MICRORIM

IT ALL COMES DOWN TO COMMON SENSE.

RAFON KINDA

# Thousands of users are satisfied with Project Manager Workbench.



# Not us.

At ABT, we already make the best project management micro system in the world. But that's not good enough.

Because we know even the best can get better. Now it is. Announcing Workbench Release 2.1 with 26 major advances that expand your options, extend your control and ease your workload.

For example, the new Workbench permits resource loading across multiple projects. Both the maximum number of resources per project and resources per task have been doubled.

Reports can be custom-tailored. Our exclusive Automated Scheduler is more responsive to your priorities. And we've added full text processing which lets you combine reports and your own comments to create a single impressive presentation document.

If you're serious about project management,

you'll appreciate the changes in Workbench. You'll also appreciate something that hasn't changed at all: the price.

Some software companies issue new releases to fix what's wrong. We do it to improve what's right. And we intend to keep on doing it.

But further improvements won't make your Workbench obsolete. They'll only make it stronger. Because we guarantee that all future enhancements can be integrated, without fuss, into the Workbench you buy today.

IBM, AT&T, Mobil, General Electric, RCA, Citibank and hundreds of other very smart companies are already Workbench users. And with Release 2.1, they're all about to become just a little bit

Ask for our free demo diskette, and see how they manage it.



Call or write for a free demo diskette!



#### Technical Bulletin

#### No. 2 in a series.

# SUBJECT: Engineering a LAN for Maximum Flexibility.

Quantum Software Systems Ltd procedy anhorances CMX 2.0 in the Ultimate Distributed Network Operating System. CMX 2.0 is now available for the IBM-PC. IBM-AT. PC compatibles. DEC Rathdow and TAMDV 2000. If you have been waiting for a Resire Multi-Easting Multi-Last Operating system with 10 orthorized new Multi-Easting Systems with control permetal or LAM support, then CMX 2.0 can offer you today what the competition cant You hough 10 promise for the LAM.

ONX 2.0 integrates no local Ana Nietverh architecture right to a first search and the format of the first search and the format in level of interfacts communication although tasks to communicate interpretation of interfacts communicated interpretation of the search of

#### ONX on the IBM-PC AT:

ONX is the first Multi-tesking Multi-user Operating system available for the AT It is available in both networked and single machine configurations. At about 2.5 times faster than the QNX sking operating systems on the same processor, QNX is the as program development environment

O/S	Computer	Processor	Measured time
QNX TH	IBM-PC AT	80286	480 usec
		80286	4 930 usec ·

Designed with extensive file security leatures. QNX 2.0 provides loan protection with network wide file permission checking based on 255 groups of 255 users in addition, each PC user may control network access to devices attached locally to their machine.

#### Distributed Processing

The QNX LAN supports distributed processing as well as distributed devices. Tasks may be executed on remote stations as easily as they may be executed on the local work station. This allows pure processing elements (PCs without keyboards or zeplays) to be putged into the network to be used as an



un-committed processing resource. This is deal to real-time process control, data acquisition and data communication

#### Global Communications:

QNX supports a full implementation of X.25 allowing connection to public networks such as Telenet and Datapac. This allows you to link geographically separate LANs together providing true global area networking.

#### Cost Effective Growth and Flexible Solutions:

DNX a stortable, and will work with the PCs you use today and more you will use fromcome. You may an and match different brand PCs on the same DNX reheads with abbotion seas. Madium or appraisal may be accomplished by adding features 10 application on a single PC with 1 to 10 attached remnass. Once your single proceeds staffs to these sizes of edyparticine, and another PC and connect terminate to the new processor if the additionable PC and connect terminate to the reverpose. Once another PC and connect terminate to the reverpose of the size of the control of the post of the QNX is affordable, and will work with the PCs you use today and

QNN 2.0 is portable. The operating system is independant of the physical local erea network it is available in a form suitable for porting to other 908-8068 60168 60266 computers in the consumer, educationel and industrial market pluca QNX is ROMable and can operate in estitle as 1260 RAM.

DOS Compatibility: PC-DGS version 2.1 can run es a task under the QNX 1.2 or 2.0 operating systems. QNX will also allow transparent access to the DOS file system partition and floopies

ONX Operating System Full Screen Multi-terrinnal Editor Extended Utilities C Compiler & 8086 Assembler Basic Compiler

Qbol (dibol) Compiler Text Processor Real Time Soelling Checker

#### Esteblished:

Quantum soid over 10,000 copies of its operating system during 1984, into all business systems environments, to developers of real time opplications, government and educational systems, to software developers integrators, universities and research istablishment.



podie Drive, HiTech Park, 215 Stafford Rd tawa, Canada K2H 9C1 (613) 726-1893

# THE PROFESSIONAL'S CHOICE



# \$309

Software Process.
CYFONT
AL WORD
LROSOFT WORD
ALTIMATE
FICE WRITER
SPELLER
WRITE \$159 \$279

\$ 75 \$ 45 \$ 45 Harvard HTPM

\$429

Chart-Master

Quadboard 384K \$269

SENSE HOWARD TAX PREPARER 6

Hardware\* \$Cell

Ultra P

Call and compare.

Tseng \$399

\$119 \$195

> Smartmodem 1200B \$365

AST ADVANTAGE AST 8 PAK PLUS (64 AST 9 PAK PLUS (38

EX GRAPHICS GE CULES GRAPHICS ULES COLOR \$275

> KEYTRONIC \$151 KOALA MICROSOFT MOUSE PC MOUSE W PAINT \*CALL FOR SNIPPIND COSTS Smartmodem 2400 \$639

> > NS.

\$209

AMBERCHROME TAXAM 122 AMBER TAXAM 420/449 ZENITH 124 AMBER ZENITH 135 COLOR

PROTECTS PROTECTS
C. ITON
DIABLO
EPSON FX. 80EPSON FX. 100EPSON LQ-1520
NF 7475A PLOTI

\$189

\$300 ECMAR GRAPHICS MASTER SENG ULTRA PAK SENG ULTRA PAK-S

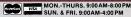




Library prices on most products. Case with your order

In New York State call (718) 438-6057

Checks—allow 14 days to clear. Credit processing—add 3%. COD orders—cesh, M.O. or certified. check—add 33.00. Shepping and handling UPS authace.—aos 33.00. per item (UPS Blue \$6.00 per item). VIY State Residents—add applicable sales tax.





# It doesn't have to be complicated to be powerful.

The pen has always been one of the most powerful ways to exchange information and ideas. Yet it's not a complicated tool.

PFS:WRITE is a word processing program that's so powerful, it can meet all your business writing needs. Yet it's so uncomplicated, it's amazingly easy to learn.

WRITE is designed for people without computer expertise. All instructions are written in plain English so you can be productive right away.

With just a few keystrokes, you can make insertions and deletions, create bold face type, even move whole blocks of text.

And if you ever need it, help is just a keystroke away.

Unlike most word processing software, WRITE prints exactly what you see on the screen. Since WRITE's screen resembles a standard sheet of paper, you'll always know what your document will look like before you print. With WRITE, it's easy to get it right the first time.

PrS:PROOF is the perfect companion to WRITE. PROOF checks WRITE documents for spelling, typographical errors, irregular capitalization and repeated words. All with just a touch of a key. WRITE is fully integrated with the PFS Family of Software. So it's easy to use information from other PFS programs and get more done in less time. For example, you can produce personalized form letters complete with addressed envelopes from data stored with PFS-FILE. You can even add a pie chart to the letter, created with PFS-GRAPH, to further illustrate a point.

PFS—it's the powerful software that's simple to learn. It's the power of simplicity.

See your computer dealer for a demonstration and discover how powerful the power of simplicity



PFS SOFTWARE
The Power of Simplicity

Data General, Hewlett Packard, and other personal computers. \*PFS/PROOF also runs on these personal computers.

© Software Publishing Corporation

# Letters to PC Magazine

1 read Bill Machrone's From the Editor's Screen ("New Life for the 8088," Volume 4 Number 13) with both personal and business interests. I can't help but wonder if IBM has missed one of the truly great growth spurts in personal computers-enhanced-performance. I have been preaching the enhanced-performance platform for over a year, so it is gratifying to see the development of satisfactory hardware and media coverage of its development.

I have a Compaq DeskPro with a 10megabyte Winchester drive that uses an 8086 chip. In his editorial, Machrone talks about 8088- and 8086-based systems with "hyperthyroid clock rates." I have located a supplier of 10-MHz 8086 chips, but I am left with one persistent doubt-are there any negative risks associated with pulling the present 8086 and inserting the 10 MHz 8086?

John C. Dahlberg Voorhees, New Jersey

Changing the chip does nothing for your system's performance. You must change the clock crystals as well. However, there is no guarantee that a DeskPro

would run at 10 MHz. Preserving a Good Name

We appreciate the reference to our product in the article "Preserving the Past on Disk," (Volume 4 Number 13). However, the correct spelling of our product's name is ZvINDEX. Our mailing address is ZyLab Corporation, 233 E. Erie St., Chicago, IL 60611, (312) 642-2201.

Sarah T. Dunn ZyLab Corp. Chicago, Illinois

#### Correction:

In PC Magazine's Spreadsheet Clinic, ("Let There Be Color," Volume 4 Number 14), the addresses for changing colors in Lotus's 1-2-3 with DEBUG were

correct, but those for Symphony work | only for a specific combination of drivers. To find the address where color-control data is stored in your own configuration, you must start by using DEBUG to search Symphony's LOTUS.SET file.

At the A>, with LOTUS.SET in drive

Preserving the Past on Disk

A: and DEBUG.COM in drive B:, type B:DEBUG LOTUS.SET <CR>

Then, at DEBUG's - prompt, type rcx <CR>

This will give you the (hexadecimal) ending address of the file: It is the fourdigit number after the characters CX. Write that address down and hit a blank <CR> to leave the file's contents un-

changed. Now, at DEBUG's - prompt, type

s 100 xxxx 07 30 0A 20 <enter>

For xxxx, you substitute the hex address you wrote down in the previous step. The s is the SEARCH command, so DEBUG will scan from the beginning of the file (100) to its end (xxxx), looking

for the values you typed in (which are Symphony's default color values). Finding them, the command will return their address (say, yvvv), the four digits after the colon

To change the colors, type

-е уууу <CR>

This will display the contents at that address and allow you to change colors by entering the new two-digit values you desire. After entering the first, hit the space bar, and the value at the next address will appear. Type a new value, then a space, then continue until you have typed four values, and hit a < CR>. Next, write the new values to your file and exit DEBUG with the following commands:

-w < CR> -q <enter>

DEBUG will tell you how many bytes it is writing and then ouit to the A>. Michael Duke

Oklahoma City, Oklahoma

Jared Taylor replies:

This patch works fine. We apologize for the error in that column. Bear in mind that each two-digit value you change affects two different colors, background and foreground. Instead of the default color values, you might try 3F 1C 4E 24 for a pleasant effect.

#### How to Write to PC Magazine

Do you have a comment, compliment, or criticism about something you've read in PC Magazine? Is there a question you'd like to open up to other readers? Send it to Letters to PC Magazine, PC Magazine, One Park Avenue, New York, NY 10016. We are not able to answer letters personally.

All letters become the property of PC Magazine and may be subject to editing. We cannot print letters that do not include a name and an address.



#### BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%, AND GET 14-30 DAY SOFTWARE RENTALS<sup>1</sup>...

In just the last few months, *The NETWORK* has saved its members more than \$24,000,000 and processed over 100,000 orders.

Listed below are just a few of the over 20,000 products available at our EVERYDAY LOW PRICES!



GAME	S & EDUCA	TIONAL SOFTWARE	
(Please add \$1	shipping and han	ding for each title ordered from below.)	
Shahash Chest (Your Toughest Opportent Shaship Milhorarie Or Saron or Tycoon Brederbund Loce Runner	110	Microsoft Flight Streetstor Microsoft Systems FC Plant Turn your PC nex A Color Macrosoft Systems Microsoft	1 22.57
CBS Soven Bridge Made Easy CBS Mastering the SAT CDEX Framing for Mord Star Comprehensive Into N Personal Computer Devideon Math States: Word Affact 1		Sterra On-Cine King s Quant Sterra On-Line Crossine Sublegie Hopf Massen Probal P. Subreater Assaure Line Kinder Comp	11.00° 30.50°
Hayden Sargon M Individual Professor DOS Individual Pre Instructor Individual Pre Instructor Individual Pre Instructor Individual Conference Individual Conference	NAP NAP NAP	Story Machine Face Maker May Diddle Diddle Rybmer & Ricches  • Spinners White Drawing  • Spinneser White Drawing Thing  • Yeard Combination More Combiners	Mar Mar Entr
	BUSINES	SSOFTWARE	
ATT (New Income Made and SE.S	2 42 AN	rading for each title ordered from below.)	9333 AV
ATT How to use Microsoft World	42.00	Morette Militario	325.00*
D Astron-Type of a D Astron-Type of a Boston Com Key (Properties)	336 90°	Microsoft Anna 11 John Freihan 7 6 Microsoft Multiple Menogram Colors & Sense	105.00
Borland Turbo Pascel Borland Turbo Pascel Borland Turbo Pascel Borland Superlay Carrier Friedrick	8.77 8.77 8.77	Osais The Word Plus Osais Systems PO Saiss ARRAY GL AF Team My	96.00°
Conceptual Institution (Park Organizar Digital Research Of M did Digital Research Of Logo Digital Research Cont Orace Digital Research Cont Orace	10.00 17.00 17.00 18.00	North Base Provided And The or Opinion Provided And And And and Opinion Research Problem Nation 3 Spatial Reference of Noviden College Systems - Sentence of Noviden College Systems	TE SE
Energraphics with Plater Option	73.00° 306.00° 34.00°	Sales Servery Hard Pariett Sales Servery Hard Pariett Sebarah Fancy Forts	130.00°
Marvard	100.00	Section Services	Mar
Human Edge Te My Lament Edge     Haman Edge Ter Turn Large     Human Edge United Terrains	137.60° 116.60°	Software Publishing NS File Willia Graph Software Publishing NS Report Service Superport N	165.00°
MCGG Knowledgeman	300.00	Vertesian Data Dive Analyses Sename Abelly	352.60
(Please wild also	point and handle	DWARE g alterges found in Italies rout to price.)	
COMPLETE SYSTEMS		MULTIFUNCTION CARDS	



MD66 Anowiedgeman	26	10.00	Sinnery Abrilly		\$2.60*
		MAD	DWARE		
(Process and all			obsesses found in Defen cout to price.)		
COMPLETE SYSTEM			MULTIFUNCTION CA		
Apple Macrosof Same System				11.40	0.25
	CALL				
	544				
Columbia Control & Portable Systems					
				306.00	83
Married at the College of the				125.00	GN
COMPAG DeshPro/Tape Backup System	2,861,84"		AST Advertige for AT	275.00	35
1048 Face CrossMonths			EVEREX Magic Condition     Author Parist Metions		
1048 Face Cree-Monitor	1 405 001		► ORCHO SLOSSOM WISK	149.00	
The state of the s	1 245 00		Suprison Proposed Charleson Mark	100.00	35
					63
Same MSC 775-Optor Portable (BM Clone			PRINTERS		
			► Citteen MSP-10 NEW		(5.73
Texas tretruments Professional	CALL		MOOPS BOCOL Five + Trac	***	
OISK DRIVES & CONTRO			NECCES 13/COLFee + Trac		/8-4
Omega Serrout Sex Cust 10MG Crives	81,300.00		P Chief MC 20 MW	200.00	0.40
			200CPS/80CCX Free+Trac		
					111.00
Assert of Prior Non-good prints			C Rock Properties \$315 AF+		
- Duffrage for farmer					1471
PC National 2008 St TERRAL 12 Hought		(10 (4)	P Speed 77 65 b Speed 77 65	215 000	440
PC Retweet 1000 Internet Lane Barbur		(10.66)			9.30
Same Unit upod it Compag's Departor			Page 1 21/00	CALL	
		(3.10)			
	77.45				
- 12 To 12 To 12 To 1					
Tanden 1911 to 211, incaptable Date	93.00	47 20V	▶ MEC 8850 SSCRS Purser	1,330-06"	128 73
Tartgrans, On the start of	2,375.00*		Manual Manual Control of the Control	200.00	76.34
Tees FD 55-8 Har revent 0500 Drives	M 80"	71.64	P Change VI 18739 9 Supra Design 1890PS		(7.86
Tees 1 2MS Helf Height Day Drive for AT		(7.40)	LO Mode Free IBM Graphy a		
			► Chadage Mt 1173-1014 District 160CPS		000
MEMORY CHIPS					
64X Memory Upgrade Kits 1 1   64X Cynamic Ram Chips 1 1	6 620	100			
	6.36	100			
2565 Oynamic Ram China 1265 AT Bother Board China		100			
			Obsesse WLBsF 200CPS 132 CCL	808.00*	(12.94
MODEMS			Otodate 2410P Pacement 350CPS Ourse Sprint 11/40 60CPS Latter Quality	機能	(24.00
Anahor Muss XX	\$ 218.00	(5.00)	Queen (SM Cable and Interfere Control	77.66	(24.00
Hinyee Smertmodern 300	125.00	(5-00)	Star Micrordes Powertype 28CPS (O	300.00	17.00
Haryes Sharthoden 7400	546,00	(5.00)		mar	64.5
LATEST IN COMMUNICATION RECHNOL					

Call nowJoin the PC NETWORK and start saving today!
FEATURED PRODUCTS!
10MB PC TAPE BACKUP \$495.00* The same unit as used on COMPAC's Desiding I Configured for Internal mounting
EPSON PRINTERS (Unbellevable Low Pricee II)           LX-80         80 COL/100CPS         205.00°           FX-85         80 COL/160CPS         315.00°           FX-185         132 COL/160CPS         440.00°
AST SIX-PACK PLUS w/64k 205.00* AMDEK V310A IBM TTL AMBER 130.00*
ORCHID BLOSSOM OK 149.00* Full Six Pack Features with Networking Capability Outstanding Price III
HAYES 1200B
TALLGRASS TG-5025 2,375.00* 25MG Hard Disk with 60MG Tape Backup
IBM Logo Full Height Drive93.00* Genuine IBM DS/DD-Not Equivalents/
IOMEGA 20MB Bernoulli 2,275.00*

Topics of Imperiod for Clinic special Control (1997) and the Control

8.50° (1.00) 8.60° (1.00) 8.60° (1.00) 7.60° (1.00)

#### COMPLETE SYSTEMS

#### IBM PC BASE SYSTEM IBM PC w/256K

Floppy Drive Controller 2 Double Sided Double Density Disk Drives



#### IRM PC HARD DISK SYSTEM IBM PC w/256K Floopy Drive Controller

1 Double Sided Double Density Disk Drive Half Height 10MB Disk Subsystem \$1,749,00\*

\$1,495,02\*

COMPAG PORTABLE HARD DISK SYSTEM



**DESKPRO SYSTEM** WITH TAPE BACKUP 640K CPU/1 Floppy/Hard Disk 10MB Tape Drive/Monitor



\$2,255.00\* w/10MB \$2,429.00\* w/20MB \$2.951.94\* w/10 MB \$3.151,94\* w/20MB

#### rsale Prices Change Rapidly...If you ever see a lower price advertised anywhere please call You will find the Network's Price will always be the best!

64K IBM PC MEMORY EXPANSION KITS 20000 Quantity Discounts Available. Guaranteed for Life!

Set of 9 Chips \$6.75\*

**BRAND NAME DISKETTES** 

DS/DD Box of 10 Guaranteed for Life! Not Generic .....

\$9.95\* .89\*

DS/DD Bulk Pack Special Packaged in 50 Guaranteed for Life! 1/2 HEIGHT DS/DD

.... Each INTERNAL PC HARD DISK

**DISK DRIVES** 







MultiMate<sup>\*</sup> \$200.00\*

\*Members pay 8% above this wholesale price plus shipping.

CALL TOLL FREE 1-800-621-S-A-V-E ( In Illinois call (312) 280-0002 Validation code: A196

TM-Registered trademark of IBM and COMPAQ

**□** NETWORK

#### . . . WITH THESE 15 UNIQUE BENEFITS

COST + 8% PRICING — The NETWORK purchases mil-lions of dollars in merchandise each month. You benefit in receiving the lowest price available and all st just 5% above published dealer wholesale price.

2 OUR 600 PAGE WHOLESALE CATALOG — Members recaive our 600 page wholesele catalog containing over 20,000 hardware and software products for the IBM PC, APPLE and over 50 other popular computer systems. THE NETWORK'S CATALOG IS THELARGEST SINGLE COMPILATION OF PERSONAL COMPUTER PRODUCTS AVAILABLE TODAY, NOW UPDATED OUARTERLY!

3 IN-STOCK INSURED FAST HOME DELIVERY — The 3 NETWORK maintains a glent multi-million dollar inventory of most popular producte, a lidening us to ship many orders from stock. Non-stock items are typically maintelined in locel were-house just days away from The NETWORK and YOU. We pay all insurence expenses on your shipment. EMERGENCY OVER-NIGHT SERVICES AVAILABLE ON REQUEST.

4 10 DAY RETURN POLICY—If you are not satisfied, for 4 env reeeon with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your antire purchase (less shipping) with no questions asked.

5 MEMBERSHIP SATISFACTION GUARANTEE—If for 5 any reason you are not setisfied with your membership within 30 days, we will refund your dues IN FULL.

EXPERIENCED CONSULTANTS—The NETWORK hires

Consultants, not order taken, in all you in product selection.

Or consulting stell possesses in access of 150 may pear of personal computer product apparence. We suck our consultant

MENDED BY QUIR CONSULTANTS STAFF PAILS TO PERFORM

AS PROMISED—WE WILL TAKE IT BACK AT OUR EXPENSE

FOR A 100% REPUID.

7 FREE TECHNICAL SUPPORT—The NETWORK supports every product it seles. Our qualified TECH-SUPPORT staff with help you essemble your system, interpret viendor documentation and gat your software and hardware to work. WE WILL GIVE YOU ALLT ME HELP YOU NEED, WHEN YOU NEED IT—FROM

ALL THE RELET FOUR DEED, WHEN YOU NEED IT — PRESENT AND THE RELET OF T

19 OPTIONAL GAME SOFTWARE RENTAL LIBRARY-The Game Rental library is available to members for just \$10 PER YEAR and permits evaluation (or just enjoyment) of any

10 SPECIAL SAVINGS BULLETINS — THE PRINTOUT
The Printout contains all the New Product listings and price changes you need to keep your Catelog up to date. Also, we buy excess dealer inventories, and store bankruptcy closeouts, which we turn around and make available to our members at fentestic savings vie THE PRINTOUT.

1 DISCOUNT BOOK LIBRARY — Working with numerous publishers and distributors. The NETWORK has assembled a fibrary of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

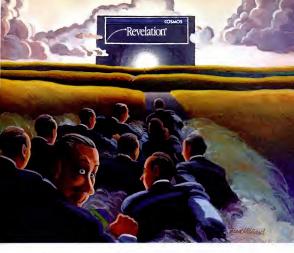
12 MEMBERSHIP REFERRAL BONUS — Our most valu-our members have been referred by word of meuh the nother sal-lafied members. For those of you who refer new members. The NETWORK will credit to cash bonus to you're occount applicable to any future purcha

To CAPPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users (see apposite page left). The NETWORK can establish open account status and essign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, end repeat or quantity buyers. The NETWORK can extend editional single order discounts, when evalleble to us from our menufacturers and distributors.

TS PRICE PROTECTION—The PC industry is crazyll Prices by day These not yearly or monthly or even weekly but often day by day? These changes are sometimes up but are mostly downlift THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REQUCTION. BETWEEN THE TIME TWO PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNTS!

CIRCLE 207 ON READER SERVICE CARD



# The rush to Revelation has just begun.

When ordinary database management software isn't enough, enlightened users are switching by leaps and bounds to Revelation, the complete database and applications environment. That's because Revelation includes

powerful tools to create applications in no time. Plus advanced features that help users get the most from their system day in and day out. For software developers, there's a

powerful applications generator that builds files, fields, menus and reports, For corporate users, Network Revelation is already off and running on both IBM's® PC Network and any hardware running Novell NetWare.™ For hard-core programmers, Revelation's R/BASIC procedural language combines the best of BASIC

with the structure and logic of C. And for everyone, there's an advanced query language and report

writer that's fluent in everyday English and eager to learn new expressions. The secret is incomparable technology: variable-length fields to con-

nology: variable-length fields to conserve precious disk space; unlimited files, fields and records; data dictionaries that make it easy to change your database when you change your mind; plus a high-speed compiler to accelerate program execution. And, of course, conversion utilities for dBase II® and Lotus

1-2·3™ are included at no extra cost. Revelation isn't for everyone. But if you're ready for a database management system you'll never outgrow, rush

to your nearby dealer.

Ask for an unforgettable demonstration of Revelation's superior

stration of Revelation's superior capabilities.

IBM is a registered trademark of international Business Mackines. Net Worr is a trademark of Novell. Inc., dBase II is a registered trademark of Ashton Tate. 1-2-3 is a trademark of Lossa Development Corporation.



# The Peter Printer Principle

In a world chock-full of confusingly similar printers, Norton gives some advice to the print-weary and sings the merits and faults of the three printers that he uses: The IBM Quietwriter, the Hewlett-Packard ThinkJet. and the H-P LaserJet.

s I said in PC Magazine's roundup of printers last year, there are far too many printers out there. Trying to intelligently choose from among them is a frustrating task and mostly a waste of time. So, let me give you my current observations on the printer scene and tell you what I think are the important factors when you're considering printers. Beware of cheap speaker syndrome.

When people buy a hi-fi system, they often buy inexpensive speakers to offset the cost of the other components. Similarly, they often buy crummy, low-cost printers so they can afford to put another widget board inside their PC. Although the analogy isn't perfect between cheap stereo speakers and cheap PC printers, as the entire value of the hi-fi system depends on the quality of what comes out of the speakers, so with a PC, printed results should consume a fair share of your PC capital budget.

#### What's the Buzz?

The next item I want to hammer on is noise. Noise pollution is one of the biggest real-life problems that PC users wrestle with. The two big sources of PC noise are your machine's cooling fan and your printer. You can't buy a quieter cooling fan (since it's built into the PC's power supply), though you can exile the CPU under your desk to cut down on the noise. Printer noise, on the other hand, is more controllable because if you have any sense, you can specify low noise as one of the key requirements in selecting your printer.

#### Peter's Printers

All three of the printers that I use now are delightfully free of the clatter and screech that characterize typical daisywheel and dot matrix printers. I can't say that they are all whisper-quiet:



They generate plenty of sound, in fact, but none of their whirrings comes close to the harsh noise that most of us have learned to associate with computer printers. My three printers, the Hewlett-Packard ThinkJet, the IBM Quietwriter, and the H-P LaserJet, span a spectrum of price and print quality; good evidence that if noise is one of your major considerations, you have a good selection of printers to choose from.

The ThinkJet is the cheapest, smallest, and also the quietest of the bunch. Although I'm rather fond of it. I wouldn't recommend it to anyone who is serious about printer output. The ThinkJet pro-

duces a terrible, crude draft quality dot matrix print, the kind you've all grown so sick of seeing. Furthermore, the ThinkJet's printing smears into a fuzzy mess when you use regular paper; it really needs special ink jet paper to avoid looking totally awful. To make matters worse, the ThinkJet takes only tractorfeed paper, and only in the standard 91/2inch width. You can't run labels or other narrow-stock paper through it.

These drawbacks keep the ThinkJet out of the serious printer category, but, to be honest, lots of people don't really need serious printers. If all you need is a printer for occasional screen dumps and simple printouts, then print quality doesn't matter, and the ThinkJet becomes fairly appealing. It really has two outstanding virtues: low noise and small size. The ThinkJet saves your eardrums and some desktop real estate, important factors with PCs.

#### The Quietwriter

Boldface-PS font.

Number two in my low-noise hit parade is the IBM Quietwriter. The Quietwriter uses a special, innovative heattransfer printing mechanism that achieves both quiet and very high print quality. The output of the Quietwriter is noticeably better than that of standard letter quality daisywheel printers, particularly if you're using the Quietwriter's

However, it does have some real drawbacks. While the printing is nearly silent, the Quietwriter mechanism clicks and clacks in an odd way, not a harsh noise, just more sound than it should

# At Applied Computer Products, we've got it all-competitive prices plus support personnel second to none.



Many computer companies think of service and support as "extras"—and jack up their prices accordingly. At Applied

Computer Products, we see things differently.

We offer the PC buyer the most economical computer package available. One that includes incredibly lowpriced IBM and compatible hardware, software and peripherals, the assurance of fast, reliable service, knowledgeable answers to technical questions, and expeditious, complete warranty maintenance.

Consulting . . . Problem solving is what sets is agant from the other telemarketing and direct retail companies. We don't just take orders. Our deficiented support team is available to answer any of your questions. We apply byze the special needs of your business in order to recommend a system of hardware and software components best suited to perform the job. On-Time Delivery . . . We fulfull the order accurately and ship or orders. We form the work of the performance of the perform

delivery . . . usually an early date, because we stock a comprehensive

inventory.

Competitive Pricing ... Purchasing in large volume gives us an advantage, and we pass that advantage along to our customers. So, you don't have to be concerned about paying for our extraordinary service. It's the thing that

concerned about paying for our extraordinary service. It's the thing that gives us a competitive edge, it's our difference. Technical Support...Our dedicated

support team is available to answer your questions and to provide continuing service after your purchase. Installation, setup, on-site problem solving and exchange or repair service are vital parts of our customer commitment. Warranty and Maintenance . . . . we are a factory authorized mainte-

nance center for hundreds of products including IBM. The warranty on any equipment is at least 90 days parts and labor. If you encounter any problems just call our technical department for a prompt resolution.

These are just
a few of the reasons
why you should call
now and learn
what a difference

what a difference "Applied" makes when a company stakes its name on it.

Our Policy

• VISA or MC, no surcharge.

• Pre-approved company check, cer-

tified check or COD.

• Allow time for company checks to

Volume purchase agreements available. Government, corporate and institutional PO's accepted.
 Call for shipping charges. No addi-

tional charge for split shipments.

• 90-day parts and labor warranties on all equipment; up to 5 years on many products.

 Orders subject to availability. Prices subject to change without notice.
 Returns may be subject to restocking

For competitive prices, prompt service and full support call

1-800-223-3860 In PA 215-322-6500

Due to space limitations we cannot list all of our more than 700 products so, to find out how competitive we are in a fast-changing market, call for an up-to-date price quotation on any Item. We'll send you a free catalog!

you'll be given a realistic date for

COMPUTER SYSTEMS	WENCH TO'N OR LEWIS CARE	FLOPPY DRIVES & CONTROLLERS
IBM PC, XT, AT (many configurations available) SCall	HERCULES™ GRAPHICS CARD	
IBM PC, XT, AT (many configurations available) SCall IBM PC with hard disk (XT look afree) SCall COMPAQ portable & COMPAQ PLUS SCall	Why pay more for just a name? The HR-2 <sup>TM</sup> Graphics Card functions	Full-Height or Half-Height, 360K, 05/00 \$119 Half-Height, 360K, 05/00 (for AT, incl. rails) \$149
COMPAQ portable with hard disk (PLUS look alike) SCall	identically to the Hercules <sup>TM</sup> Graphics	TEAC Half-Height, 360K, DS/DD 5109 Half-Height, 660K, DS/DLMD density (for PC) 5139 Half-Height, 1 2MB (AT high capacity replacement) 5Call
CHIPS 64K, 128K (AT motherboard), 256K \$Call	Card listed for \$399. We uncondi-	Half-Height, 640K, QS QUAD density (for PC)
8087 & 80287 math coprocessors SCall	tionally guarantee it. If it does not	MAYNARD ELECTRONICS
HARD DISK & TAPE DRIVES	perform exactly as the Hercules	MAYNARIO ELECTRONICS  Report disc controller  warrail or parallel port  Scall Sanstar modular floopy disc controller  1999 perala parallel clock game medales hard disk and tipse controller medales  TALL TREE BYSTEM  Illiamen C.
	Graphics Card return it for a full refund.	Sandstar modular floppy disk controller \$199
36—170MB hard disks w tape backup	30-Day Money Back Gusrantee	serial parallel clock game modules from \$35
20—70MB internal drive for AT	\$199	TALL TREE SYSTEMS
	Harriston is a transmission of terrorides Computer	Jdiskette: with Uformat-2 (controls 1.2 MB high capacity drives in PC)
I-OMEGA (BERNOULLI BOX)	Technology	JFormat-2, Jet Orive \$40
20, 30 MB internal drive for AT (with hardware)		SOFTWARE
MAYMARD ELECTRONICS	PRINTERS & PLOTTERS We carry a full line of tractors, sheet leeders, printwheets,	INTEGRATED SPREADSHEETS
flogoy and hard disk control on single board) from \$750	nbbons, paper, acquistical enclosures, printer buffers and	ENABLE \$CM
MAYMARD ELECTRONICS 10, 20, 30MB internal hard disks for PC (available with lioppy and hard disk control on single board) from \$750 20, 27 (50MB internal or extended lape backup (for PC, XT COMPAD or AT) activated the strength of the s	AB switches for all printers.	ASHTON TATE Framework. \$Call LOTUS Symptons, 1-2-3 . \$Call
additional tape controller cards \$139	Parallel Printer Cable 6' BROTHER, EPSON, DKI. CITIZEN, NEC. HP. TOSHIBA. \$25 ADVANCED CREATIVE TECHNOLOGY	LOTUS Symphony, 1-2-3
	ADVANCED CREATIVE TECHNOLOGY	MICROSOFT Multiplan \$129 MOBS KMan, KPaint, KGraph, KReport from \$259
	SYSTEMIZER (Smart buffer for orinter sharing)	SPI Open Access \$179
TALL GRACE	MSP-10:15:20:25 (18 mg, warranty) from \$370	PFS Plan, Write, Report, Filefrom \$79
25—80MB hard disk with 60MB tape backup \$Call	EPSON	ACCOUNTING SOCIAL SIS on accounting modules from \$299
25—80MB hard disk with 60MB tape backup SCall 50MB enternal backup (allows Boppy like operation) SCall MICROSCI MINI SCRIBE/PRODME/TANDON/SHUGARY 10, 20MB internal hard disks for PC trom \$535	We carry the complete printer line including RK-100, FX-80 + 8, 100 + JK-80 color	SORCIM IUS six accounting modules from \$299 REAL WORLD seven accounting modules from \$225
10. 20MB internal hard disks for PC from \$535	RK-100, FX-80 * 8 100 * JK-80 color LO-1500 (etter quality dor matrix), Spectrum LK-80 & LX-90 (RK-80 F-T Replacement). \$Call NEW FK-185 . \$Call	GRAPHICS
MULTIFUNCTION BOARDS	Spectrum LK-80 & LX-90 (RK-80 F/T Replacement) \$Call NEW PK-185 \$Call	IMSI 4-Point Graphics PC/Paintbrush \$59:\$79 MICROSOFT Chart \$159
AST RESEARCH Suspack Plus with 64K (up to 384K) w/S, P, C		MICROGRAFY PC-Oraw \$295
	OKIDATA	Mouse Systems w PC Paint \$149 PFS Graph \$89
Memory Board with 64K (up to 384K) and clock \$239 LO Min; or I/O Plus III with senal and clock \$139 ADVANTAGE with 128K (up to 3MB) for AT \$Call	We carry the complete printer line including ML92: 93, 83A, 64 (129-200 ops) SCall PACEMARX 2410 (350 ops, IBM version) SCall	DATABASES
	PACEMARX 2410 (350 cps, IBM version) SCall NEW ML-182, 192, 193 (120-180 cps w-P & P)	ACMITON TATE differe III differe III \$275/329
senal parallel game options from \$35 MAYNARD ELECTRONICS		ASHTON TATE obase III
MAYMAND BLECT FORMED Modular Muniform y Board street Beard, Sammand Street Beard, Sammand Street Beard disk and tape controller modules from \$15 hard disk and tape controller modules from \$135	Plug 'N Play option available for all models . SCall	
serial, parallel, clock, game modules	-P1340 (LO OOT MATRIX 80 COL) \$629 NEW P351 (LO. 132 COL) \$CM	MICRORIM R: Base 4000:5000, Clout, ReportWriter SCall MOBS KMan, KPwint, KGraph, KReport from \$259
hard disk and tape controller modules		PFS File \$89
INTEL 80ARD (for PC or AT) SCAII ORCHID TECHNOLOGY Blossom with 64K (up to 384K) w/S. P. C \$199 PC TURBO-186 with 128K (up to 640K) \$649 OLIADRAM	HP-15, 2S, 35 (17-32 cps. Letter Quality) Irom \$399	WORD PROCESSORS
ORCHID TECHNOLOGY	NEC   SPINWRITER 2050, 3550, 8850   from \$699   PINWRITER P2, P3, color CP2 and CP3   \$Call NSW ELF (Latter Quality) for IBM   \$465   MEM ELF (Latter Quality) for IBM   \$465	MULTIMATE ADVANCEO MULTIMATE
PC TURBO-186 with 128K (up to 640K) \$649	PINWRITER P2. P3. color CP2 and CP3. \$Call NEW ELF (Letter Quality) for IBM \$465	MICROSOFT Word at souther \$230
QUADRAM Quadboard with 64K (up to 384K) w/S. P. C. G. \$219	HEWLETT PACKARD	VOLKSWRITER Delust \$169 WORDSTAR, ProPack, 2000 & 2000 Plus from \$195 THINK TANK (outline processor) \$119
	THINUET (Inket printer 80 COL) \$Call LASERJET (Quet, 8 pages min) \$Call PLOTTERS: 7470A (2 pen), 7475 (6 pen), 7550 (8 pen) \$Call	THINK TANK (outline processor) \$119 FASYWRITER II w speller mailer \$195
JRAM 2 (up to 2MB for PC) from \$169 serui, parallel, clock modules from \$59	PLOTTERS: 7470A (2 pen), 7475 (6 pen), 7550 (8 pen) \$Call	EASYWALIER II Ausbeiter waiter
Jdiskette (floody controller module)		PROJECT PLANNING
JRAN-AT (memory board for AT) SCall TECMAR	VIDEO/GRAPHICS CARDS	HARVARO Total Project Manager \$275 MICROSOFT Project \$159
CAPTAIN with 64K (up to 348K) w/S, P. C	GRAPHICS CARD (with parallel port) \$309	SORCIM-IUS Super Project \$189
	GRAPHICS CARD (with parallel port) \$309 COUR CARD (with parallel port) \$165 PARADISE SYSTEMS	COMMUNICATIONS
MODEMS	Medular Graphic Cand (color and mono graphics) . \$279 Multidisplay Card (Color & Mono w Par ) \$225 SIGMA DESIGN	HAYES Smartcom II \$99 MICROSTUF Crosstalk XVI \$99
AST RESEARCH REACH (with CROSSTALK XVI, half card) \$419	SIGMA DESIGN	PFS Access \$65
HAYES SMARTHOOFM 1200 (separate) \$419	COLDR 400 (640 x 400 RGB) \$5599	LANGUAGES & COMPILERS BORLAND lumb Pascal 3 4 Toolbox MCPRSSPT C Compiler Ferrian. Macro Assembler Latice C compiler. C-food. Pavel. Rain C, C debugger \$Call MORGAN PROFESSIONAL BASIC \$69
MARTMODEM 1200 (edemail)   SA19   SMARTMODEM 12006 (with SMARTDOM II)   S385   SMARTMODEM 2400 (edemail)   SCAII   NEW TRANSET 1000 (Buffer)   SCAII	CHAUFFEUR (Mone Graphics wire Drivers) \$285 PREVIEW (Herc. Graphics, wiPar Port) \$299 MONGGRAPH PLUS (Monographics wiSer. Par. Clock) \$299	BORLAND Turbo Pascal 3.4 Toolbox \$45/35
SMARTMODEM 2400 (external)	PREVIEW (Herc. Graphics, w Par Port) \$299 MONGGRAPH PLUS (Monographics w Ser Par Clock) \$299	Lattice C compiler, C-Food, Panel, Run C, C debugger \$Call
		MORGAN PROFESSIONAL BASIC 509 WORDTECH Systems dBase III, dBase III Compiler \$Call CLIPPER (dBase III Compiler) \$499
PC Modern half card (with Crosstalk XVI)	GRAPHICS MASTER (Hi-Res Graphics Color or Mono) \$479 EVEREX	CLIPPER (dBase III Compiler) \$499
COMMUNICATION PRODUCTS	The Edge (Mono or Color graphics) SCali	UTILITIES
AST RESEARCH 52S1, 3780, SNA, BSC, PCOX SCAIL	POWER SUPPLIES	UTILITIES BORLAND Sidelucki Superkry \$35/45 CENTRAL POINT Copy II PC \$35 EINN Schammer \$10
CXI 3270 (coax or remote) &3278/79 Plus . SCall		
DCA	13S Witts PC replacement Par Supply \$119 MAYNARD	
IRMA (3278 terminal emulation)	35 Watts external clip-on Pwr Supply \$119	ROSESOFT Protey 595
MONITORS & TERMINALS	SAFT 200 Watts and 400 Watts urenterruptable Per Supply SCall	SOFTSTYLE Protworks \$49 X TREE (file & directory management) \$45
AMDEK TERMINALS		GAMES HOME
	DISKETTES	INFOCOM 70RX I/II/III Harbbukers Guide
	MO2HD High Capacity for AT (box of 10) \$49	MICROSOFT Flight Simulator \$32
PRINCETON GRAPHICS (PGS) AEW MAX-12E (works w/mone or color card) \$189 HK-12 and SR-12 \$Call		Later than the same of the sam
MEW MAX-12E (WORKS W/mone or color care) \$169 HK-12 and SR-12 SCall	VEDRATIM	For competitive prices, prompt service and full support call
TAXAN 440 (RGB Ultra Res requires PERSYST BoB card) \$Call	OS/00 (box of 10 plus 2 FREE Limited Offer)	
	MISCELLANEOUS HARDWARE	1-800-223-3860
124 TTL (Monochrome, Amber)	BROOKS	In PA 215-322-6500
KT-7/PC (IBM Keyboard Compatible Terminal)	BN 6 (surge supprinces filter 6 outlets) \$79 KENBINGTON MICROWARE	III FA 210-322-0000
NETWORKS	MASTERPIECE (monitor stand surge suppr.) SCall	
	Keytronics KB S151 keyboard \$179	APPLIED COMPUTER
PC NET PC NET II SCAN ORICHID TECHNOLOGY	Mouse Systems PC Mouse w PC Pant S149 Microsoft Mouse (w PC Panthrush) S139	PRODUCTS, INC.
ORCHID TECHNOLOGY PC NET, BLOSSOM PC NET (piggytack)	Joyatlek (Krzft or TG) \$Call	1633 Republic Road
SCAN STHERMET SCAN	Oberon Omri-Reader (Optical Char Reader) SCatt	Huntingdon Valley, PA 19006
		CIRCLE 129 ON READER SERVICE CARD
HADDWADE	DEDIDHEDALE	. COPTWARE

SOFTWARE

make. More-significant problems are the machine's relatively slow speed, clumsy paper handling in all three modes (regular platen, pin-feed, and cut-sheet feeder), and painfully slow cut-sheet paper

motion. Also, the ribbons are breathtakingly expensive, and you go through these \$12 buggers very quickly. Despite my criticisms, however, I like the Quietwriter a lot.

Blazing Laser

Finally, at the top of my heap is the Hewlett-Packard LaserJet, the most popular of the current crop of laser printers. The output quality is superb and the price is equally stratospheric. The major drawback of all my printers is that they limit what you can feed through them-they mostly accept just regular 81/4- by 11-inch

#### Laser printers have real limitations that you should be aware of. But for mainstream printing, nothing matches the quality of these babies.

paper. You can feed an envelope into the LaserJet but it's a little clumsy, and continuous-feed stock (like conventional labels) is completely out of the question. For printing address labels, I expected to be able to easily use special mailing-label paper designed for use with photocopiers (which is what a laser printer is, under the skin). But my LaserJet jams when I try to autofeed label stock (it will take it nicely when I hand-feed the label sheets, but that shouldn't be necessary). Likewise, I discovered that the LaserJet can't print on the top and bottom row of labels, wasting 18 percent of the paper surface

These label difficulties illustrate the special problems that crop up with any laser printer. These machines have real limitations that you should be aware of. But for mainstream printing, nothing matches the quality of these babies.

#### Other Contenders

While these three printers give me a nice spectrum of price and features along with their quiet, lack of noise is hardly my sole criterion for selecting printers. Let me mention a couple of other ma-

chines that have caught my eye. The two printers that I like most are both from IBM. One is the Ouietwriter's daisywheel companion, the Wheelwriter. As a daisywheel printer, the Wheelwriter has all the virtues (and limitations) of the conventional letter quality

#### A NEW KIND OF COMPUTER STORE WE DISCOUNT EVERYTHING ★

. 349.95

OKIDATA 103 400 05 OHIDATA 84 649.95 OKIDATA 90 000.05 900.95 CITCH 8510 RPPLE C ITOH 8510 PUS... 319.95 899.95 C ITOH F-10 40 C ITOH F-10 55 1099 95 GEMINI SCL 10 20 000 G€MINI SG-15. . . 379.95 940 05 Panasonic 1092

OKIDATA

OHIDATA 192

EUF-360 449.95 2050... 999.95 8850 1490.05

2400 RS232 .. 599 95

Hayes 1200 RS232..399.95 \* 1200 B INTERNAL ..... 349.95 PROMODEM 1200B IBM...269.95 PROMODEM 1200 ......299.95

SIDEKICK......39.95 TURBO PASCAL ......49.95 FLIGHT SIMULATOR ... .36.95 MANAGING YOUR S. ..109.95 COPY II PC ..... 29.95

\* \* CALL FOR OTHER PRICES \* \* BECAUSE HARDWARE AND SOFTWARE PRICES ARE CHANGING SO RAPIDLY,
WE URGE YOU TO CALL US FOR OUR
VERY LOWEST CURRENT PRICES!
WE APPRECIATE YOUR BUSINESS and will do evarything we can to make you happy TERMS: FO B, Westminster, CA We accept VISA Mastercard Cash, Money Orders, Checks, Certified ks ara beltar. Purch

Add 2% for bank cards & P.O. s. Ask abour our re olicy. Prices are subject to change and hopefully ill go down. Subject to stock on hand. SPECIAL EDITION

72

#### FOSON FX 85 349 95 EPSON FX 185 489 95 EPSON LX 80 000 05 EPSON JX 80 489.95 EPSON LQ 1500 . 870.05

BROTHER HR 15 300.05 BROTHER HR 95 400 05 749.95 BROTHER HR 35

549.95 TOSHIBR 1351. 1079 95 TOSHIBA 351 1095.95

SILVER-REED SLVER REED 550 SILVER REED 770

300.05

770.05

Lotus 43 \*\*\* SYMPHONY ...... 409.95 FONTPAKS 1 THRU 11 EA.... 19.95 GATO ......29.95 AST SIX PAK + 64K w/FREE BORLAND SIDEKICK....249.95 64K RAM (9) SET ..... 9.95 256K CHIPS EA. .................4.95 44.95

GARDEN OF EDEN COMPUTERS

800-762-3227

800-331-0045 🚾 INSIDE CALIFORNIA Magnolia, Westminster, CA 92683 % blk. N. of the 405 Frwy. Mon-Fri 10-5:30 Sat 10-5 CLOSED SUNDAYS & TUESDAY

printers. But the Wheelwriter handles paper particularly well; it's the best, I think, that I have ever seen. It uses a smooth blend of platen, tractor, and cut-sheet mechanisms that is compact, slick, and easy to use. It's also relatively quiet for a daisywheel

My other favorite is the inexpensive IBM Proprinter, a more-or-less standard dot matrix printer with a near letter-quality mode (now pretty much a dot matrix standard). What makes the Proprinter special is its cheap price, its fast draftmode speed, and its unique front-load feature, which lets you easily feed in envelopes and letterhead sheets without first unloadine the fanfold page.

## Freedom from Choice

As I said, there are far too many princires out there, and there are even more now, unfortunately, than there were a year ago. That's actually terrible news. Lots of printers from lots of different numfacturers doesn't really wided your range of choices because of overlap and application. This wealth of printers just adds to the difficulty of making a sensible choice from so many confusingly you'll find in this issue are a beroic effor to make sense out of the market.

The two printers that I like most are from IBM. One is the Wheelwriter; the other is the IBM Proprinter.

suspect you'll find that the clearest thing these charts will communicate to you is just how difficult it is to select a printer that's right for you.

Also, we know that all these printers can't sell, and it's a safe bet that quite a few manufacturers will get out of the business. If you pick a product from one of those companies, lots of luck getting service in a couple of years when your printer needs it.

#### Conclusion

That's why I'm particularly pleased that three of the five printers I like the PC MAGAZINE • SEPTEMBER 17, 1985 most are from IBM and that the other two are from Hewlett-Packard. I'm not smart enough to be able to predict what companies will still be in the printer business in a few years, but IBM and Hewlett-

Packard unquestionably are strong enough to stay in the game. Think about that factor when you go to select your printer—the most service-prone part of your computer system.



Omaha, Nebraska 68147

"Symphony 1.1 now makes translating data from and to other programs push-button simple. It is the first program I've seen that is actually fun to install."

Beb Harris, Deputy Assistant Director For Budget Analys. Congressional Budget Office.

"I'm thoroughly impressed by Symphony 1.1 and glad to have it. You're going to have to use dynamite to get it out of my machine. It's almost my whole wish list in one."

Dwight Muse, Assistant V.P., Internal Reporting

"In our work in financial planning and analysis we have found that Symphony 1.1 does two things. First, it allows us to build spreadsheets which are a little bit bigger than would otherwise fit in the computer...Second, in doing a spreadsheet layout design, we now have greater flexibility because of the new memory allocation."

Ron Distorich, Managor, Financial Planning and Analysis Consulting

## LOTUS PRESENTS SYMPHONY 1.1

It was a sneak preview.

We gave advance copies of Symphony release 1.1—the new version of the popular five-function PC software—to some of the most sophisticated software experts. The reaction was overwhelmingly enthusiastic. Here's why:

1. NEW EXPANDED MEMORY, Symphony release 1.1 works with the new expanded memory boards to provide a solution to the "big data" issue, allowing users to store formulas, labels, and floating point numbers in up to 4MB RAM.

2. NEW MEMORY ALLOCATION SCHEME. The new

sparse matrix scheme provides greater flexibility and eliminates the need to arrange worksheets to conserve memory.

 MACRO LIBRARY MANAGER. This permits the creation of libraries of macros that can be accessed from any worksheet and allows the development of multiple worksheet applications.

4. 8087/80287 SUPPORT. Symphony release 1.1 can take advantage of 8087/80287 math co-processor chips, increasing calaculation speed by up to 60 times. 5. 1-2-3 COMPATIBILITY. New Symphony supports file translations between Symphony. 1-2-3\* release 1A and "With Symphony 1.1, Lotus has again set the industry standards so high that they'll force the rest of the industry to shoot for the same."

R. L. Martin, Manager Decision Support Systems Exton Corporation, Cleveland, OH



"I am very excited about the memory feature. It's a breakthrough for Symphony in that it significantly broadens the universe of Symphony users."

> Vobert Schultzer, V.P. Computer Systems (Corporate Finance) Vankers Trust Co., New York, NY

"The Macro Library function is great. Symphony's strength lies in its command language."

> Sally Nagy, Senior Information Systems Analys Aeroiet ElectroSystems Co., Azus, CA

# -THE TOUGHEST CRITICS RAVE.

Symphony

Jazz.™ This fall, Symphony and a new version of 1-2-3 will have compatible spreadsheets, allowing the sharing of data files with no need for translation.

The critics have already acclaimed the programming potential found in Symphony's Command Language—with its conditional statements, branching and pannetee pressing—the Losus "File Format and Add-In Tools. And they've praised Symphony Link"—the micro-to-maintame Add-In All of which memorate the micro-to-maintame Add-In All of which memorate the micro-to-maintame Add-In All of which micro-to-maintain and the All of the All of

And now Symphony is easier to learn, with a new install program and new documentation.

For your own private performance, visit your authorized Lotus dealer today.

If you already own Symphony, call 1-800-TRADE UP. (in Canada 1-800-447-4700) and we'll tell you how to get your upgrade kit.

Symphony

## MICROWAY'S 8087 RUNS 1-2-3™!

MicroWay is the world's leading retail-er of 8087s and high performance PC upgrades. We stock a complete selection of 8087s that run at 5 and 8mhz. All of our coprocessors are shipped with a diagnostic disk and the best warranty in the business - one year! We also offer daughterboards for socketless computers such as the NEC PC and PCjr, and a board which increases the clock speed of the 80287 from 4 to 6 mhz. Our NUMBER SMASHER" includes 512K ram. It will run the IBM PC at clock speeds up to 10mhz and achieves a throughput of .1 megaflops with 87BASIC/INLINE, Intel Fortran, or Microsoft Fortran. Software reviewers consistently cite MicroWay software as the best in the industry! Our customers frequently write to thank us for recommending the correct software and hardware to meet their specific needs. They also thank us for our same day shipping! In addition to our own products which support the 8087 and 80287, we stock the largest supply of specialized software available anywhere. For information call us at

617-746-7341

## **FASTBREAK**

MicroWay's software turns on your 8087 during 1-2-3" execution. Recalculations run up to 36 times faster. When used with the NUMBER SMASHER" it can provide a total in-crease in 1-2-3" execution speed of up to 79 to 1. FASTBREAK provides you with the unique capability for running other programs on top of 1-2-3. These programs can be written in BASIC, PASCAL, Fortran or C and can access the current values in your 1-2-3 work



# 87 Support

or the IBM PC, PC

NUMBER SMASHER* The Word's Fast- st Accelerator Card for the IBM PC, XT, and Con- atibles' includes an 8086 and 8087 part tested 1 flowing, and 512k Dytes of high speed ram- compatible with all software, operating systems of baceware Your program speed in increased for program speed in increased in up to 28 times faster on the PC than on an 0287 equipped PC AT. \$1590	87 BASIC/INLINE" converts the outpute libid. Basic Compiler into optimized in infer code which searches up to seven time ter than 87 BASIC. Supports separately comine subrounties which are located in their segments and can contain up to 64K byte code. This allows programs greater than 1 Requires the IBM Basic Compiler and M. Assembler, linkude 87 BASIC.
MATRIXPAK" menages e MEGABYTE! intiten in assembly language, our runtime pac- accurately manipulates large matrices at- sny fast speeds includes matrix inversion and e solution of simultaneous linear equations. slabbe from MS Fortran 33, 87MACRO, end PASSIC/INLINE.	87BASIC* includes patches to the IBM I Compler and both runimes libraries for LI TRANSPARENT 8087 support. Provides a fast performance for all numeric operation cluding trigonometrics, transcendensies, ed subtraction, multiplication, and charson
7FFT* Written in assembly language, per- rors Forward and Inverse FFTs on real and com- tes arrays which occupy up to 512K bytes of the strength occupant of 512K bytes of amming, complex vector multiplication, and com- lex to radial conversions. Callable from MS For- an 87MACRO, C, TURBO PASCAL or 78ASIC/INLINE.	development package. It contains an of Brany of numeric functions including tent details, Ingonometrics, hyperbolics, enco decoding and conversions which take full ast tage of the 5007's capabilities. 87/MACPL save you man years in development time! Fr IBM or NS Macro Assemble; Version 10, 2, 30
7FFT-2" performs two-dimensional FFTs. deal for image processing Requires 87FFT \$100	translator and disassembler Produces asset language listings which include public sym external symbols, and labels commented
GRAPHICS PACKAGES irralmetic for MS Fortran or Pascal	external symbols, and labers commented cross references, lideal for understanding patching object modules and libraries for w source is not available
DFIXET" – Ellminates the AT hard disk pro- lemt A disk which thoroughly checks PC or AT and disks for bad sectors and updates the MS OS file allocation table accordingly \$149	RTOS is a multi-user, multi-tasking real time alling system. It includes a configured versi- later's IAMX-96, LINK-96, LOC-96, LIB-96, Or and MicroWay's 87D-BUG. Runs on the IBM XT, PC-AT and COMPAQ.
RTDEBUG" - a professional debugger with 087 support, a sophisticated screen-oriented ascending processor, and fince features finch include the ability to skip tracing through ranches to calls and software and hardware	INTEL COMPILERS¹ FORTRAN-88.

XT	, PC AT and Compatible	S.
of	, PC AT and Compatible 8087 5mhz. Including DIAGNOSTICS and one-ye	\$109
ed wn of K!	8087-3 5mhz	
00 00	8087-2 8mhz For Wang, AT&T, DeskPro, NEC, Lee	\$175 ding Edge.
sic FR	80287-3 5mhz For the IBM PC AT and Compaq De	.\$199
ER	For the IBM PC AT and Compaq De	skPro 286.
in-	287Turbo 6 mhz	\$375
50	64K RAM Set	\$7
are	64K RAM Set 256K RAM Set	\$49
ect en-	256K CMOS RAM Se	et \$49
	128K RAM Set PC AT	
eril	AST Advantage"	
he or	.IRAM-2" (ØK)	\$160
50	JRAM" AT (ØK)	\$229
bly	MAYNSTREAM 60 meg	\$1695
SE OF	FORTRAN, C and BASIC Microsoft Fortran Version 3.3	****
	IBM Professional Fortran	545
ch Ch	Ryan-McFarland Fortran FORLIB+ or STRINGS and THINGS	
	Lattice C. Microsoft C Version 3.0.	299
er-		
of 36.	FLOAT87 IBM Basic Compiler Version 2.0	150
00 00 00	87BASIC/INLINE	200
w	87BASIC/INLINE. Summit BetterBASIC* Summit 8087 Module	175
50 50		105
00	MACRO ASSEMBLERS	
no.		
	IBM Assembler with Librarian V. 20 Microsoft Assembler Version 3.0	155
and	PASCAL and APL	199
	PASCAL and APL Microsoft Pascal Version 3.3	199
	PASCAL and APL Microsoft Pascal Version 3.3 Borland Turbo with 8087 Support STSC APL **PLUS/PC. Protent API	199 85 450 85
	PASCAL and APL Microsoft Pascal Version 3.3	199 85 85 85

Kingston, Mass. 02364 USA (617) 746-7341

P.O. Box 79

SERVICE SECURITY SECU

SE GGEM DEED SEE SE

The World Leader

# An Important PostScript

PostScript, a printer-control language, is a flexible and powerful means of bringing images and text to paper. To date, only the Apple LaserWriter uses it, but others will follow.

The Apple Laser Writer's snazzy graphics and near typest-quaght the public eye. But its power comes not so much from its much-vaunced hardware as from an innovative printer-control language called PostScript. PostScript, developed California, is considered by many the best of a new breed of languages for controlling high-resolution printers and may soon become a new standard in the printing and typescripting field.

PostScript is an output page-description language that specifies the appearance of a print page. Page-description languages aren't really a new idea; all computer printers have a few options that you can control. But what is different about the new laser and other high-resoultion printers is the number and complexity of the features you can control. Printers such as the Laser-Writer, which can hinted a high-new graphen must be of the control of the printers which can the printer such as the case of the printers which the printers handle things only one line at a time.

#### Freedom of Choice

If you use a full-featured laser printer, you don't have to worry about simple matters such as single or double spacing or bold and underlining—you can choose from a variety of typefaces in a wide range of sizes. Do you want white letters on black (instead of black on white?) No problem. How about a 20-percent gray-tinted background? Done. Can you meres in a erran you skeeted on the

screen 2 days ago? Sure, no problem.

For a system to have all this power, it has to have a sophisticated software program that presents to the user a clean, reasonably simple facade, allows full control over all the features, is efficient,



Hon Jettr)

and can be easily adapted to a wide range of different hardware.

## Flexible Output

That's a tail order, but PostScript certainly rites to fill; it This high-level language hides the messy details associated with talking to high-resolution printers such as fiddling with bit-maps and majulating fonts. This device and resolution independence means the same page description generated by PostScript will work across a wide range of output devices. For example, you can compose an advertisement on the screen of a PC or a Macintosh using a "what-you-see-is-

what-you-get (WYSIWYG)" editor and then print it on a 300-dpi LaserWriter to check the placement of the artwork and type. When everything looks good, you can then send the same input file to a 2,500-dpi laser phototypesetter for a final copy.

### **Magical Handling**

However, the real magic of PostScript is the way it handles fonts. It stores each typeface, such as Times Roman, Times Bold, or Helvetica, in a compact outline format and represents each character of the alphabet as a list of points along with instructions about how they are to be connected when the character is printed. For example, when you tell the system to print the letter A in a certain size and typeface, the processor consults the outline and generates the correct bit-map to represent that character. Since constructing the bit-map slows things down, Post-Script stores each bit-map after it is used on the assumption that it may be used again because most typesetting involves a lot of type that is all the same size and typeface. If a given job involves many different type styles, PostScript will eventually replace bit-maps that are not heavily used with new ones that it has just created.

PostScript's use of outlines to represert typefaces gives you a tremendous amount of flexibility in how you can treat type. And because it mathematically manipulates the outlines, it is a trivial task to change the type. You can reverse it, flip it over so that it is a mirror image, slant it at any angle, stretch or compress the letter, fill it with a graphic pattern, or print | it as a hollow outlined shape. On the other hand, if all you want to do is set regular type, you just ignore the other features of the language.

The PostScript Language

PostScript is actually a full programming language. In addition to a rich assortment of special graphics operators needed for drawing lines, creating

shapes, rotating images, and so forth, it has all the standard tools of a regular programming language. You can define procedures, manipulate variables, construct loops, and perform math. PostScript resembles FORTH to some extent because it is a stack-oriented, or Reverse-Polish,

language. Although the programming-language aspect of PostScript is powerful, you probably will never have to use Post-Script directly. Application programs such as word processors, business forms generators, presentation graphics packages, and page-formatting systems hide PostScript. Several PC software packages already support PostScript on the LaserWriter, including Microsoft Word, ScenicWriter from Scenic Computer Systems, Do-It from Studio Software (a WYSIWYG program for composing display ads), GEMWrite-a modified version of Volkswriter Deluxe-from Digital Research, and the PC TEX typesetting system from Personal TEX. As of this writing, XyWrite II-Plus from XvQuest has limited support, and XyWrite III will fully support PostScript

Full Featured, Proven ...

## ACCOUNTING SOFTWARE

General Ledger Accounts Receivable Accounts Payable Payroll Including State & Local Taxes Inventory With Purchase Order & Order Entry

OR ALL SYSTEMS ABOVE FOR

Runs on IBM (PC jr/PC/XT/AT), AT&T, EPSON, TANDY (1000/1200/2000), TI, WANG, COMPAQ, CORONA, SANYO, COLUMBIA\*

Requires 128K RAM, 2 Floppies or Fixed Disk, 80 Column Printer, MS-DOS, PC-DOS 2.0 or later.

To do special FORECASTS, REPORTS, ANALYSES, etc., - You may use . .

Lotus 1-2-3 Framework Wordstar Dbase II/III Multiplan

Symphony Condor Word Perfect My Word\* or any other Database, Word Processor or Spread Sheet package that you are now using with our data

The + (plus) key on the IBM keyboard functions as an ENTER key for data entry.

Exceptionally easy setup. From package to com-puting in less than I HOUR. All systems use generally accepted accounting principles.

Detailed manual is on diskette, you print it in your printer.

Disks are NOT Copy Protected!!

COMPLETE FOR \$25 PRACTICING ACCOUNTANTS

WORD PROCESSING

A WS-like word processor with Sort, Merge, Quick Print, More than 100 Operations, ASC11

Accountants Package, in-cluding Client Write-Up with General Ledger, After-the-fact Payroll, Billing, and 1040 Tax Package, Everything you nee COMPLETE FOR \$150

ATTENTION DEALERS!!! Call or Write Now for the VERY BEST MARGINS (over 50%) in the Industry.

MICRO COMPUTER **BUSINESS SERVICES** 12703 Stuebner Airline Suite 202 Houston, TX 77014

TO ORDER CALL: 1-800-334-0854 For More Information Call (713) 444-6269

Service Contract Available Shipping Charges \$5 00 Texas Residents add 6-1/8% tax COD Charges \$5.00 Payment by Check, MC or VISA MONEY BACK GUARANTEE!

when it is released. Lending It Out

Besides Apple's use of PostScript in the LaserWriter, Adobe has also licensed PostScript to phototypesetter maker Allied Linotype and to laser printer manufacturers Dataproducts and OMS. However, as of early summer the LaserWriter is currently the only PostScript "engine" available for purchase.

Dataproducts has announced two 26 page-per-minute laser printers that will use PostScript. The LZR-2660 prints on 8.5- by 14-inch paper; it will cost \$20,900. The LZR-2665 prints on 11- by 17-inch paper and costs \$22,900. OMS has announced three PostScript printers. The first one should be available this fall. and it will compete head to head against the Apple LaserWriter. It uses the same Canon laser engine as the Apple does, but it will have the Adobe-designed controller, which has 500K more RAM than the LaserWriter and should give it significantly faster throughput. This QMS PS 800 will cost \$7,995. OMS also plans to offer a choice of 12- and 24-page-per-

# MORTHEASTERN

88 Ryders Lane, Strafford, Connecticut 06497

LOLL	el di	MIVO				io kyders Lane, S		ira, Connecticut	06497
1000	90	• WE W	/ILL TRY	TO MATCH AN	D BEAT AN	Y ADVERTISED PRIC	E		
		* SCHO	AROUT	OUR FREQUEN	IT PURCHASE	ORDERS ACCEPTED	n soe	TWARF PENTAL LIE	RAPY
0				K-mall	11 0 11 01	Grane Coming		DISKETTES	,,,,,,,
ACCESSORIES		CEM Dearny 1.0 w/Dearny DECESION RESOURCES	21.00	PEACHTREE	CHI CHI	Mark Mace	24.00 23.00 23.00		17.00
is her		Derwede	229.00	Back to Bone Seden POWERBASE SYSTEMS	- OAL	Soutopensk BOSERAL RESEARCH			17.00 14.00 18.00 10.00 45.00 14.00
Six Plots Plots 2010	369.00 369.00 245.00	SQUARES	164.00	PRENTICE RAIL	225.00	Dr Leen.	\$3.00	Deplete 05/00 Moved 05/00 Moved 05/00 Moved 15/00	19.00
Six Polic Plan 1948 Six Polic Plan 448 CORE DITERNATIONAL		Sorbet Analyse	97,00 200,00 148,00 203,00 180,00	PROFESSIONAL SOFTWARE	270.00	Modern 1 S SI	21.00	Messel 05/00 Messel 15:00	16.00
20 MC Al (complete peckage)	1250.00	Seriet Karage	146.00		223.00 744.00	HARCOURT BRACE SOVEMOVICE Computer CE!		M0304W 2040	16.00
	20.00 33.00	Spreadure Link	100,00	West Flor willow. QUARTER DOCK SOFTWARE	129.60	Computer SAI HARVERD ASSOCIATES	45.00 45.00	MODEMS	
Med III Jeyclak MEDCAUS		BHERTRONICS LANGUAGE	229.00	STAL WORLD		K (166)	99.00		107.00
Calor Emphis Card Remotherms Scophics Cord SMMCVACTIVE COMCEPTS	143.00 CALL	TYTE GREEN SOFTWARE	174 00	Business Programs	410.00	PC Loss NESSAM EDGE Sind Pales	28.00	Eable for PC, Compaq MATES	
BENCHATIVE CONCEPTS	20.00	PRIMACES, INC.	114.00	Same +	215.00 225.00	HOMA	85.00	Snortee II 2 1 Snortee I 200	275.60 314.00 345.60 626.00 124.00
Figur File 50 IONEGA Beneuili Bus	CMT	FOR AND CRILER			CMT CMT			Smortmodern 12008.	311,00
		Cont. Code St.	CALL	Red Period 6.0 SCARROROUGH See Personal Not Worth		Addres Magazen Magir Spalls Number Stumper Reader Rabbit	70.00 70.00 74.00 34.00	Spotnoles 7430	626.00
Renterplace IT Sales	85.00 33.00	PUNK SOFTWARE	99.00	Sort Personal Net Worth	61.00	Romber Stomper Sendo Estário	24.00	PROMETHOUS	
Gaineral Printer Stand	15.00	Sciences 2 III	34.00	Spelight	224.00	Word Spinner MACA	20.00	Francism 12008 benduter only Francism 12008 with self-water	230.00 252.00
MIC HE BAN Namedy	12.00	Projet Horston	208.00	SOFTWARE GROUP		San Buildes Black	45.00		
MARADISI SYSTEMS	CALL	Project Monager 1 8	245.00	Sportenes Percepture	Off	Sin Fixx SCARROGROUGE		1700 Pilo Extend 300/1700 P. Motern Refitzed P. Motern Refitzed or Control 6571	365.00 355.00
PARADEL SYSTEMS Redule Craptus Card Built Deploy Card Paudid Printer Part	278.00 73.00	The Motor	31.00	Open Annes PSS Acure	395.00	Build & Book About You	24.00 23.00	PRINTERS	385.00
		Piece	110.00		52.00 77.00 77.00	SCHOLASIK			
PC Galor Grouphics Board PC Storochester Stand Short Size Size to 1848 Soord	167.00 167.00 125.00	HOMBARD SOFTWARE Bed Enter Andrew I	155.00	PIS Grouph B.ET PIS Flors A.ET		Agent USA Syste hads	24.00 24.00	EN IS R	131.00 151.00 500.00
CHAPLAN	125.00	MSI .		P/5 Pred 8-00	52.00	SMON & SCHESTER	23.00	HI 25 HI 25 Inster.	500.00 114.00
Expended Durchoord w/2048 Expended Durchoord w/2048	247.00 229.00	P. Paint Book willing Name	84.00 115.00			Speciality			
Execcoss		Accessory Prompties	CALL .		_		18.00 28.00 18.00	16-40 P 140-55 P	319.00
BACCORS Dove has for PC js Expension Board for js 16/12/85	475.00 199.00	Account Restroble	OH /	ORDERS	NIV	Story Medical	18.00 25.00	130557	1,110.00 475.00
	10.00	Investory Order Eathy Precessing CI	gii.	ONDENS		SAMMENOTES		Stowers & 10-700P . CENTROVECS	70.00
Some Was be			-/	TOLL 1	CDEE	Marie Morate Pees of Calor	21.00 21.00	BY HALL BY HE	
I fam Bood wisdroom	CALL	Serocose CALL	/	IULL	TREE	GAMES			379.00
Bard Drive Salt Systems	CMIT	Seat Service	/ <b>-</b> -			RUHOW	25.00	UI 80	222.00 CALL
10A4 Insured Bard Date erigets	CALL		1_5	300-38	とつ_ワク	12 Inn	35.00 35.00	HEWLETT-PROUADD	
	CALL	Enried And	1-6	,	) <u>L</u> -L4		35.00	MANAGANAN TALLI	CALL
SD-SSB Half Height 260% drive	CALL	Manager 57.00		7 DAYS	/WV	Ancient An		All Models	CALL
Captala Sourd (384E)	285.00	Nonegor 38.00		9AM to 11			17.00 21.00	7000	600.00
Capital Sourd (1848) Capital Sourd (648) Capital Sourd (648) Graphics Nation Sound Marries Multifuration	285.00 185.00 449.00 355.00	Lander	١	YAM TO II	rm tol	CBS SOFTWARE	11.00	154	978.00
BUSINESS SOFTWA	355.00 DE	Presentation 92.00	1	E OVERNIGHT	A ID CLIEDO			8850 P21 with treatment	978.60 CALL 515.00 745.00
		Controller Card 32	M / LKE				21.00	P31 with Hoose	
Data Sour Kanager II	134.00 107.00 57.00	Speed Key Tablet w/Selfware II	2.00	CALL FOR D	ETAILS	Stepper III INFOCOM	30.00	193F	479.00
APTL SOFTWARE TECHNOLOGY	57.00	LEADONG SDGC	34.00			Cartileppts or Senatellare	24.00 24.00 24.00 24.00 29.00 26.00 26.00	All others Microline 182	1,790.00 CALL
Note form 33, ASHTON TATE	61.00	Sand Processor Sand Processor williad Storge & Spo	25.00 100.00	_		Enchanter Fertindden Owerd Winddown Guide	24.00		215.00 349.00
8 See 1 2 42	245.00 CAUS			PFS Support 8-01	44.00 77.00	Hindshilver Guide Servere or Infidel	24.00	Okinete 22 with Teacter.	215.00
D Sou #11.1	CALL	Volcouritor Dolesso 2 1	148.00			Marie II	24.00	EZP 1090	187.00 344.00 439.00 615.00
SPI Count browning	140.00	Phinksuck 2 0	11,00	Superada IN	205.00	MICRO LAB Mone 2017er	24.00	EEP 1092 EEP 1093	439.00
875			11.00	SPORNATER		The First	24.00	COADBAN	
Description Complex Overhead Express	178.00	HICEOGRAFI K Day MCROPRO	220.00	STANSETH IS THOUGH WHAT		F-15 Toda Toda	21.00	Oxedene	Сиц
Destinal Express BATTERIES INCLUDED Electronic Cheditions BORLAND	44.00	NICROPED Po Ceries Pod	109.00	STONEWARE	30.00	F 15 Stellar Engle MICROSOFT Basic Services	N M	GENE All Guese Printers	CALL
BORLAND	17.00	For Cyrian Fock Wardstor 2000 1,61 Wardstor 2000 Flot 1,61	CALL	Advence CG Rester TURNING POINT	265.00	ORIGIN SYSTEMS	31.30	SAVER REED EST 400P	240.00
Saletak					64.00	PC SOFTWARE	-	EUP 556P EUP 576P EUP 770P	140,00 149,00 795,00 409,00
Separkey 1.8	77.00	Bickotta	OIII	EDUCATIONAL	SOFTWARE	Arecheir Querretteck Operationale Blackinsk	23.00 23.00	THE STATE STATE OF THE STATE OF	689.00
Separate 1.5 Toris 200.7 2.0	32.00 48.56 71.00 38.00 77.00 42.00 50.00 21.00	Clear 2 d. Extended Report Victor L.Z.	124.00 64.00 247.00	ATI Insuine Pages Pagestre.	80.00	PROFESSIONAL SOFTWARE	24.00	Presidents	325.00 345.00 447.00 221.00 490.00 599.00 CALL
lute food 16	42.00	Estended Report Victor 1.2	147.00	BABBORS Connector VIII	9.00	finis foret SCHENPLAT		50 10 50 11 52 10	447.00
Turbe Toolber 1.0	22.00		CALL	BRIEF BESTANCE		Eas Unton's Blocklack	44.00	SC 10	227.00
Total later 1.0		Der 1 61	100.00	the Boot 1.0 CBS SOFTWARE	145.00	Anner MONITORS	26.00	9.15 9.16 9.15	490.00
	225.00	Cabal Compiler Ferrora Compiler	100,00 400,00 205,40 17,00 124,00 175,00 145,00	Special Bridge SAT	45.00 87.00	ARDER MONITORS	385.00		CALL
South Total Money South Total William South William	84.00	New Acambia	17.00		27.00	Calor 400 Calor 700 Calor 710	450.00	SPECIALS	
Soul Street Willer	47.00	Mone Multiplier 1 2	172.00	Quart Luis	N.00		129.00	AMDEK Calar 300 ***	375.00
	22.00	Proof Campiler	175.00 145.00	All progresses.		PRINCESCON NE 12	445.00	Color 200 **** Holes 200C *** Holes 200A ***	123.00 123.00 147.00
	18.00	MACROSTUP		Allen Address	21,00		164.00 575.00	Capy PC	
FOI.	78.00	Countel 2012 5	107.00	Notes Nultelization	71.00 10.00 21.00	Soon Doubler	174.00	TURS 6100***.	365.00
Name Accountant Plax Tome Canalogue	275.00 275.00	MONOGRAM Defen and Garra will control	- 45.00	Spelling War Spelling War DEVENOW AND ASSOCIA	20.00	171 17" Green 171 17" Green	125.00	Sympleony Multimore 2 30	265.00 410.00
CONTRIBUTED SOFTWARE FOR Name Assertant Plax Tame Conloque Properly Honogement See Adventogs name translationess	275.00 38.00	MOUSE SYSTEMS	133.00	DEVENOUS AND ASSOCIA			135.00	Serve Unities 2.0	215.00 34.00
DATA TRANSFORMS			57.00	Speed Beader II .	20.00 48.00 28.00 79.00	679 Super N. Rev. 168	795.00	PRINCESONIC CEP 1051 ***	24.00
	15.00 47.00	OPEN SYSTEMS Business Programs PC SOFTWORKS	400.00	Spell It Blood Article	19.00	440 Uhrs III Res. 868	335.00 795.00 415.00 465.00	Framents	54.00
DIGITAL RESEARCH CHICAG	99.00	PC SOFTMARS Impation Picture Show	130.00	DESIGNATURES Exempton Motions and Localis	26.00	475 Super Nr Res. EGB 475 Super Nr Res. EGB with codin 445 Ulter Nr Res. EGB Edb Board for 440 Person! Susan by EBK Colin	345.00	Sets Natural DS/DS	21.00

If something you would like is not listed, just call. For inquiries and connecticut Orders (2011) 1575-1586.

If it is little you are consistent of the control of the cont

minute PostScript laser printers that use Xerox print engines at prices of \$19,995 and \$29,995. However, the company has not yet announced any release dates for these products.

## Typesetting Use

Allied Linotype plans to release two high-resolution typesetters in October that will be completely PostScript compatible. The Allied typesetters are "laser

film recorders' that produce an image by shining a laser on silver-based photographic paper or film, which, in turn, must be developed and fixed in a settle processor with standard photographic chemicals. Because of the extreme places are shown to be supported to the produce of the produce of the produce of the produce of the produce very high-definition dots that are both smaller and sharper than the correct overed dots produced by a laser winder.

printer.
These phototy pesetters have much higher resolution than the LaserWriter, but they aren't cheap; for \$39,500 the tion of 1,270 dpi and a vertical resolution of 1,270 dpi and a vertical resolution of 1,000 dpi. The \$49,950 (glus a required \$6,900 CRTerminal console) innotronic 300 has twice the horizontal resolution at 2,340 dpi, but it has the same 1,000-dpi vertical resolution. These prices include only the basic fonsi had match those in the LaserWriter.

## Toward a Standard

Because of the early success of the LearWriter and the commitment of Allied Linotype to provide high-resolution laser properties that use broakscript. PostScript PostScript standard for controlling laser printers and other high-resolution dot matrix devices. But, at least for now, it sint likely Post-Script will be the only standard. The competing linetpress protocol from Xerox has and it is used by Xerox sizefit to control the high-volume laser printers common on mainframe computers.

Conclusion

So far, IBM hasn't indicated what it plans to adopt as a laser printer protocol, so at least one more widely used page-description language might well appear. Of course, things would be much tider in everyone would adopt a single dominant cormatting language, but because that has seldom happened in other computer areas (for example, local area networks), there's little reason to capped it to occur the property of the course of the cou





The Paradise Modular Graphics Card runs 100% of the software packages with graphics written for the IBM PC standard, on both the standard IBM monochrome and color monitors (and

equivalents).



Graphics Cards using Earlier Technologies run only 20% of the software packages with graphics written for the IBM PC standard, and only on the IBM

monochrome monitor (and equivalents).

PARADISE
RUNS THE
SOFTWARE
THE OTHER
GRAPHICS
CARDS DON'T

PARADIS

EARLIER

You can find the Paradise Modular Graphics Card at better IBM PC dealers. If you need more information, call us toll-free at EXT 208 (800) 527-7977 or (800) 822-2020

(inside Calif.)
and we'll
gladly answer
your questions
and send you our
free "Graphics
Information Pack"

PARADISE

allowance on

Paradise will send you a check for \$50 when you send us your old IBM Monochrome Card or Hercules Graphics Card with warranty registration and proof of purchase of a Paradise Modular Graphics Card. Offer expires December 31. 1985.

edrmerks Panadar Fanadar Medalar Grapher Co stedar Systems, for Newsles Grapher Card Nevea myster Sectioning Repotent Instruments ISM

## YOU FORCED US TO MOVE!



Because of the tremendous response you've given I o our FREE OVERNIGHT DELIVERY and "10 OFF policies, our growth has been phenominal! Even we did not project how rapidly we would expand, Outle honestly there were times when is seemed like the whole country was trying to place an order...et the same time!

order...et the same tima! We resite that some of you have had problems getting through four phones simply could not handle the volume; and, yes, some have even gotten their shipments late (our shipping depertment has been on a 12 hour schedule)...to those of you, WE APOLOGIZE for the inconvenience end would like to say THANK YOU tor your petience.

A one million dollar investment has ellowed us to solu these problems...we've just moved into our new World Head-quarters, beeled up our sales department, edded a spanking new phone system and built a fully automated warehouse. Oh, sorry, we elimost lorgot "Harold" (who's extremely iest, but very sensitive) our new 100 terminel computer system. He's designed to speed up order processing to get your shipments out the door..test. Sorry Herold.

## INTERNATIONAL ORDERS EUROPE

Announcing Logicsoft Europe!

Our European francis may now order directly through our European francis may now order directly through our Amsterdam businesses of the most accept a lateral to the control of the most accept after the soll was a control of the most accept and provided the control of the through the control of the control of the provided the control of cont

Call 020-83-ABS4 or mail orders to: LOGICSOFT EUROPE BV pb 9480, 1036 AL AMSTERDAM, HOLLAND

CANADA

For our Canadian customes wa've installed a special local number, 416-283-2354. Now you can get the big-gest sevings in mall-order for the cost of a local call Or, it you wish. Telax 286905 Soft UR FAR EAST AND AUSTRALIA ed ask for our internetional Depart erts on export and you get to take erts on export and you get to take adventage of our great mail order prices. Telex 20000: Soft UR. Please cell or telex to confirm pricing it

ANY PRICE BY Overnight Delivery

See Our Card for Details

myster

**EVERYTHING YOU ALWAYS** WANTED TO KNOW ABOUT BEATING A PRICE BUT WERE AFRAID TO ASK ...

or How I Learned To Save Money Without Really Trying,

We know there are still a few of you who have shied away from ordering from

us (you know who you are) perhaps think-ing our \$10.00 off and FREE overnight policles were a "gimmick" or a "come-on" pressure you into something. We'd like to tell you how simple it really is. Just pick up the phone and dial 1-800-645-3491, then tell your sales agent

you'd like to beat a price (don't be embar sed; he's noi), the name and date of the publication and who you want us to beat. No gimmick, no come-on, it's that

Realworld

(MBSI)

# CONFUSED

We don't blame you, that's Why We invite you to give us a call.
We've evelueied over 50 of them and just because you can save a lot of more byving mail order shouldn't mean you have to secrifice service. We want to take the time to assist you before you buy. We realize that an accounting system can set out to a stacebel investment and helping you end up with the right package for your money is what doing business is all about.

ACCOUNTING SYSTEM Information Open Great Peachtree State of Systems Accounts Payable 1409 1499 counts Reprivable 1299 Fixed Assets 1409 Seneral Ledger

1389 1479 1575 1395 1280 1470 1575 395 1389 1479 Inventory 1299 1409 1499 1575 539 Job Costino 1405 1499 1389 1539 Material Management 409 1299 1400 1389 479 575 rder Entry/Processing 1365 1409 499 1575 Payrol Report Write 409 1479 Sales Invoicing Purchase Order Entry 409

JUST A PARTIAL LISTING OF ACCOUNTING SYSTEMS - CALL TODAY

110 Bi-County Blvd., Farmingdale, N.Y. 11735 State...518-249-8440 • In Canada... Customer Service 1-800-431-9037

THE LOGICAL CHOICE A Member of the Logic Group



See following pages for Software, Hardware, Special Order Bept., Programmers Bept., PC Jr. Corner and our Computer Forms Division.



ŏI Î ì 15 ľ i 2

П

į

ø

01

01

ZΙ

41

41

n

n

n

ï

П

П

П

П

OGIC SOFT INCREDIBLE NEW SERVICE BREAKTHROUGH

VIA...

Purolator courier



#### WDRD PRDCESSING \$259 WORDSTAR 2000 PLUS 309 265 345 WORD PERFECT (New Rowase) 245 Microsoft Word. 245 rice 249 MULTIMATE Volkswriter Deluxe 165 Peachtext 5000 \_ Facurater IVSneller/Mailer 195 255 Frix & Wordix FINALWORD 225 Samna III 325 Xy Write II Plus, Think Tank 125 pls: write Wordplus PC with Boss 355 DATA BASE MANAGEMENT KNOWLEDGEMAN \$255 Lowest Price Cornerstone \_\_\_ Tim IV 189 B:Base 4000 265 R:BASE 5000 399 DB Master 475 d Base II (New Release) Condor III

DATA BASE MANAGEME	NI (cost)
Clipper (d Base III Compiler)	\$365
Clipper (d base ill Compiler)	299
Data Base Manager II (alpha)	1/3
Infostar plus	100
pfs: lite & pfs: report	163
prs. me a pts: report	163
REVELATION	/45
Powerbase	
Personal Pearl	
Easylier	235
Superfile	159
Superfile	owest Price
GURU LU INTEGRATED/SPREADS	SHEETS
GURU LU INTEGRATED/SPREADS LOTUS 1-2-3 (White they last)	SHEETS \$305
Superfile  GURU  INTEGRATED/SPREADS LOTUS 1-2-3 (White they last)  Finable	SHEETS \$305
Superfile GURU  INTEGRATED/SPREADS LOTUS 1-2-3 (White they listel) Enable Smart Series	SHEETS \$305 399 579
Superfile GURU  INTEGRATED/SPREADS LOTUS 1-2-3 (White they said) Enable Smart Series Ability	\$305 \$305 399 579
Superfile GURU INTEGRATED/SPREADS LOTUS 1-2-3 (whise they last) Enable Smart Series Ability FRAMEWORK	\$305 \$399 579 339 355
Superfile GURU INTEGRATED/SPREADS LOTUS 1-2-3 (White they rash) Enable Smart Series Ability FRAMEWORK Open Access	\$305 399 579 339 355 395
Superfile GURU  INTEGRATED/SPREADS LOTUS 1-2-3 (white trey uset) Enable Smart Series Ability PRAMEWORK Open Access Electric Desk	\$305 399 579 339 355 395 229
Superfile GURU INTEGRATED/SPREADS LOTUS 1-2-3 (While they tast) Enable Smart Series Actify PRAMEWORK Open Access Electric Desk SYMPHORY (Limited Quarety)	\$305 \$399 579 339 355 395 229 429
Superfile GURU INTEGRATED/SPREAD! LOTUS 1-2-3 (white tridy trast) Enable Smart Series Ability FRAMEWORK Open Access Electric Desk SYMPHONY (unvised Quarenty) Supercal of Supe	\$305 \$395 579 339 355 395 229 429 175
Superfile GURU  INTEGRATED/SPREADS LOTUS 1-2-3 (whee they tast) Enable Smart Series Actility FRAMEWORK Open Access Electric Desk STMPHORY (Lumide Duamery) Supercaca 3	\$305 \$395 \$79 \$395 \$355 \$395 \$229 \$429 \$175 \$129
Superille GURN  LINTEGRATED/SPREAD: LOTUS 1-2-2 denie mey mart) Enable Enable Smart Senes Azithy Open Access Electric Desk \$YMPFMONY (Lenied Ouerey) Superica 3 Multiplan TKI Schver	\$305 399 579 339 339 339 355 229 429 175 129
Superille GURN  INTEGRATED/SPREAD! LOTUS 1-2-2 other any sarty Enable Smart Series Azithy Open Access Electric Desk SYMPHONY (Limited Quarry) Multiplan TKI Schwer	\$305 \$395 \$79 \$395 \$355 \$395 \$229 \$429 \$175 \$129

AAAAGNEY TOUR NOMEY 118  OF ACCOUNTED TOUR NOMEY 118  OF ACCOUNTED TOUR NOMEY 118  OF ACCOUNTED TOUR NOME 118  OF ACCOUNTED TOUR 118  OF A	FINANCIAL (cont.)	. 1	1
ome Accounted Plus 99  or Control Plus 99  in the Cont	inancier II	8115	IN
ordespocal Tax Planers 318  accident State (State State Stat	AANAGING YOUR MONEY	119	
and Asset System (ESS) 489  - 189	forme Accountant Plus	99	Ш.
Compared	Yolessional Tax Planner	319	_
RAPHICAS   259  MANITAMENT   MAPPINGS   257  MANITAMENT   MAPPINGS   257  MARITAMENT   MAPPINGS   257  MARITAMENT   MAPPINGS   257  MARITAMENT   MAPPINGS   257  MAPPINGT   MAPPINGS   257  MAPPINGT   MAPPINGT	ixed Asset System (BES1)	439	1171
GRAPHICS  SAATMASTER 5275  Gommaster 155  So Graphes 285  So Graphes 285  So Graphes 315  So G	Market Manager Plus (Dow Jones)	179	110
### SANTH ### ### ### ### ### ### ### ### ### #		269	ibo.
sgmaster   195	GRAPHICS		
sgmaster   195	CHARTMASTER	\$275	IIS!
#\$ Graphics 289 #\$ Graphics 385 ### Private 1319 ### Graphwiter Combo Paix. 485 ### Crosolit Chart. 175 ### MERBRAPHICS 259 ### Combo Paix 175 ###	Signmaster	195	llo
Rs graph	BPS Graphics	289	III 🖂
ASS	ofs: graph	85	ш.
ASS	GRAPHWRITER	319	Hitti.
(Icrosoft Chart	Graphwriter Combo Pak	485	Ikal
NERGRAPHICS 259 nergraphics with plotter option 255 C Draw 295 lem Draw (incl. Dosk Top) 95	Airrosoft Chart	175	IP.
C Draw 295	MERGRAPHICS	259	1150
em Draw (incl. Desk Top)95	nergraphics with plotter option	325	
em Draw (incl. Desk Top)95	C Draw	295	יכוו
	Bern Draw (incl. Desk Top)	50	
	AUTOCAO as i	ow as 799	111
PROJECT SCHEDULERS	PROJECT SCHEDULERS		lico
HICROSDFT PROJECT \$165	AICROSOFT PROJECT	\$165	11
	ARVARD TOTAL PROJECT MGR.		

\$138 Quickode III 115 d Graph III 65 d Util III 99 k Graph 59 75 k Paint k Text

\$159 \_175 Sideways 175 109

Clout 2 DATA BASE (cont. \$145 Clout 2 \_\_\_\_\_ Extended Report Writer \_119 \_45 PROKEY 4.0

Norton Utilities INEW Rei \$49 \_65 65 SIDEKICK (sepret

GENERAL CROSSTALK XVI (New 7td) 109 Smartcom II. Sidew Bys Copy II PC 45 39 DESK ORGANIZER 65 Spottight

Wordperinct Sorter

WORD PROCESSING

FANCY FONT

pls: proof

Soethx

Wordplus (Dasis)

Punctuation & Style

**National Sales Hot Line** 

Customer Service 1-800-431-9037 New York State..516-249-8440 Canada.....416-283-2354 Domestic/International Telex...286905 Solt UR

THE LOGICAL CHOICE

110 Bi-County Bi gdale, N.Y. 11735

Project Scheduler 5000 (Schor)

## **NEW! Expanded Special Order Dept.** We know there are many products that simply

cannot be found through mail order. We've solved that problem...just ask for our SPECIAL ORDER department...We've got the suppliers still at low mail order prices!



AND COMPARE

TEAR AND COMPARE

TEAR AND COMPARE

PC JU	NIO	R CORNER	
SOFTWARE		HAROWARE (Cont Keytronic 5151 Keyboard	

Lotus 1-2-3 (While they last)\$309 Wordstar149	Keytronic 5151 Keyboard\$17 Keytronic 5149 Num, Keypad 5
Electric Desk189	Jr. 126K Booster (Normon)14
HAROWARE	Quadram Expansion Chassis 51:
	Quadram Exp. Memory23
PC Mouse (Mouse Systems)129	Quadmem Jr21
NEW PRODUCTS A	DDED DAILYCALL!

PROGRAM	ADA	ERS DEPT.
Concurrent PC DOS (w/webcows) _		
Pascal MT + (PC DOS)	_349	C Compiler (MS)
PL/1 - (0R)		Microsoft Sort
Display Manager - (OR)	359	Cobol Compiler(MS)
Access Manager - (OR)	269	Business Basic (MS)
LATTICE C COMPILER	305	FORTRAN COMPILER (MS)
C-Food Smorgasbord	_119	C86 C Compiler

## GENERAL HARDWARE

					_		
PRINTERS* 025**		PRINTERS (cont	(d.)	MULTI-FUNCTION	BOARDS (cont.	MODEMS (CO	nt.)
DIASLO		MSP15 MSP20 MSP25 PRINTER/PLOTT	619	ST8		PROMETHEUS Pro-modern 1200 Pro-Modern 1200B	355
36**	\$1229	MSP20	579	Super Rio (64k)	\$329	PROMETHELIS	
025**	619	MSP25	769	Rio Plus II (64k)	259	Pro-modem 1200	\$375
630-API	1529	BRINGER (BLOVE	Engs	Rio Grande	375	Pro-Modern 1200B	
630-ECS**	1799	HOUSTON INSTRUMENT	rue.	Chauffeur	Lowest Price	DUADRAM	
630-API 630-ECS** EPSON L01500		PC Plotter	\$475	TECMAR		QUAGRAM Asher Quadmodem IIL	\$395
L01500	\$1199	101101110		Captain (64k.	\$199	Ouadmodern II I	awest Price
Parallel Interface	79	MSP25 HOUSTON INSTRUMENT PC Plotter MONITORS* AMOEK Color 300 Color 500		COMMUNICATIO	NS BOAROS	Maxwell 1200 PC	WEST THE
JX-80	599	AMUER		APT		Maxwell 1200 DC	0205
LX-80 ** LX-60 Tractor/Feeder	265	Color 300	\$255	AST-5251-11	9699	Maxwell 1200 V	420
I X.60 Tractor/Feeder	30	Color 500	389	AST-SNA	0032	2400 PC	433
BY-100	399	Color 600	479	AST-BSC	500	VEN TEL	039
FX:80 Phis**	379	Color 710	579	AST. 3780			0976
FY.185 (New)**	569	12" Green 300G	135	AUT-0100	DOADOE	PC Modern 1200 1200 Plus	9015
DIK!		12" Amber 300A	145	MAPHILA	BUANUS	1200 Dun	333
6100	\$430	12" Amber 310A	169	Management	2406	1200 FIUS	
6300	700	NEC JB 1201 JB 1205		Monograph plus	3425	BACK-UP DEV	ICES
MANUECHANN TALLY		JB 1201	\$159	PTOVIOW		ALLOY	
Count SO	6976	JB 1205	149	EVEREX	0074	PC Quick Tape (60Mb)	\$1719
agent ou	4275	JC 1215 JC 1216	239	Graphics Edge HERCULES Graphics Card		SYSGEN Image (10Mb)	
160	5/9	IC 1216	399	HERCULES		Image (10Mh)	\$835
180	849	DOWNER TON ADAPTHON	499	Graphics Card	\$325	MOUSE INPUT O MOUSE SYSTEMS PC Mouse w/paintbrush MICROSOFT	ENICES
MEU	0740	PRINCETON GRAPHICS RGB HX-12 RGB SR-12	0400	Color Card	169	MOUSE SYSTEMS	ETICES
2030	\$719	HUB HX-12	3489	MA SYSTEMS		DC Moure wingenthruch	£120
2050**		HGB SH-12	233	Peacock Color Boan	\$245	MICOGOCT	
3530	1329	Scan Doubler Board (%) S		PARADISE SYSTEM	\$	Microsoft Mouse (Sena	0 0140
2030 3530 3550 6850 Pinwriter P2** Pinwriter P3**	1396	Amber Max-12E	185	PARADISE SYSTEM Multi-Display Card	\$215	Microsoft Mouse (Buss	120
6850**	1949	MARGAUG		Modular Graphics C		SURGE PROTEC	T000
Pinwriter PZ**	675	Quadchrome 12"	\$465	Options A & B	Lowest Price	KENSINGTON MICROW	TURS
Pinwriter P3**	895	Quadscreen 17	1595	QUADRAM		Master Piece	due cone
OKIOATA 182P		OUADRAM Ouadchrome 12" Ouadscreen 17" Ouadscreen 114" Amberchrome 12"	465	QUADRAM Quadcolor I	5196		
182P	\$239	Amberchrome 12"	165	Ouadcolor II		Oramond	***
84-IBM	799	TAVAN		SIGMA		utarriono	939
192-IBM	409	1000	Cone	Color 400	\$549	Bramond	49
193P	559	TAXAN 100G 105A	9125	ST8		Sapphre	59
2410P	2295				\$315	Ruby	69
OUME Sprint 11/40** Sprint 11/55** Sprint 11/90**		121	149	TECMAR		KEYBOARG KEYTROHIC 5150 5151 (Deluxe) 51528	S
Spnnt 11/40**	\$1299	210	149	Graphics Master	\$459	KEYTRONIC	
Sprint 11/55**	1595	210	259	TSENG LABORATO	RIES	5150	\$159
Spnnt 11/90**	2199	420	409	Illtra Pak	\$545	5151 (Deluve)	179
		440		MODE	2 M	51528	641
SILTER RECU	0070	MIII TI.CHNCTION	BOARDS	HAYES	mu	0.020	
400	22/9	AST RESEARCH	BURNUS	Smartmodem 300 ,	\$205	MEMORY CH	IPS
500	349	AST RESEARCH Six Pak Plus (64k)	\$259	Smartmodem 1200	445	MEMORY CH 64k (200ns) 256k (150ns)	\$3!
550	205	Mega Plus II (64k)	275	Smartmodem 1200	B 365	256k (150ns)	69
770		Mena Pak (256k)	360	Smartmodem 1400	710	DISKETTE	2
TOSHIBA		Advantage (128b)	420	MONATION		LOGICTRAK 5 W"-100 W	BHARANTEED
P351 Tractor	\$165	MO Plucii	125	Access 1.0.0	0.476	Dontte side, double despity.	fi per bes
P351	1375	DOCUMO	195	Access 1-2-3	34/5	20 a hoves no	r disk \$2.35
1340	779	Discuss (O tr)	0220	omarr-uat Plus (Int.	355	10.19 hoves no	dek \$2.50
COTTON		ONA COAM	\$236	Professional 2400	835	2.9 hoves no	r diek \$2.00
770 TOSHIBA P351 Tractor P351 1340 CITIZEN MSP10	2400	Overfloand of the	0045	PRENIALE		1 hov ne	del 92.91
MOPIU	o4U9	woodooderd (64K)	\$245	Popcom X100	\$379	1 OWPE	won 33.91

\*Due to weight restrictions, Printers and Monitors are shipped UPS...FREE \*\*Parallel interface reg...Ask sales agent



Customer Service 1-800-431-9037

ale, N.Y. 11735

Domestic/International Telex... 286905 Soft UR

TEAR AND COLL





Whether you're a big name on Wall Street or a small name on Main Street, Xerox has a printer for you. Like Diablo dot matrix printers that deliver perfect letter definition. And ink jet printers with full color graphics capabilities. Even state of the art laser printers that run up to 120 pages a minute.

And when it comes to daisywheel printers, Xerox

invented the game. We have a full line of Diablo daisywheel models, including the D-25, which turns out letter quality documents starting as low as \$745\*

Every Xerox printer is unusually quiet, reliable and compatible with IBM and Apple. And they're backed by Team Xerox, a wide array of Team Xerox

people, products and services to meet your information needs So, to make your business

look good, call on Xerox. We wrote the book on printers. For more information call I-800-TEAM-XRX, ext. 103, or visit your nearest dealer or Xerox sales office



Xeron B. Dublio<sup>®</sup> and the identifying numbers berein are trademarks of Xeron C

## NEW COMPUTER PRODUCTS & PRODUCTIVITY TOOLS

# ULTRA PAK®

The one board that does it all for your PC: Lotus 1-2-3 • Graphics • 132 Column Spreadsheet . User-Expandable Memory · Disk Controller and much more.

**PURCHASING** MANAGERS

**Bob Hamirani** Corporate

Manager

\$550



## Productivity Software for **Customized Solutions**

The SOFTEASE Family of Products includes

 DATA EASE . WORD EASE GRAPHEASE
 DOSEASE

Now You Can Customize To Your Specific Needs

## PROFESSIO DESK ORGANIZER **PROGRAMS**

· SIDEKICK

Increase your office efficiency with the latest in desk organizations · SPOTLIGHT · DESK ORGANIZER

MYDESK

## 70111040

## COMPUTERS

COMPAG PORTABLE 2DD, 256K, DOS 2.1 \$1.995

Cali for DeskPro Prices

## **IBM**

IBM-PC, XT and AT's Available. IBM AT Networking Stations with Multilink advance. Call

GL/PR/AP/AR/INV/OE/CI/CS/BILLING WORK IN PROCESS \$695/36 integrated With Symphony/Lotus D Base III/F Systems For 196 Different Worlds Aveil for: UNIX/XINEX/IBM XT/AT, Etc.

## SOFTWARE

Framework	
Enable 13	95
Lotus 1-2-3 12	
Lotus Symphony	
dBase III 13	79
Multiplan (IBM/MAC) 11	35
Word Perfect (4.0) 12	65
Multimate (3.3)	75
PFS Series 779/	Ea
Knowledgeman (1.07) 12	75

#### RETAIL OUTLETS Pick 'N Pay Software San Jose, CA Telephone (408) 293-3360 Telephone (602) 285-1700

## HARDWARE

Printers (Epson, Okidata, Toshiba, NEC) ...... Hercules Monochrome/Color ...... 305/185 AST 6-Pak (64K) ...... \*250 M.A. Systems Pro Kit for PC Juniors ..... Call Plantronics Color ...... \$389 Irma Card \*850
Miniscribe 10MB Drive w/DTC
Controller Card \*695 null Box 20 MB ...... 12,495

MC-P A

ORDER DESK ONLY-(800) 292-3360 TOLL FREE DUTSIDE CALIF 1630 Oakland Rd., Suite A114, San Jose, CA 95131 (408) 293-3360

ROER DESK DALY (800) 272-3360 TOLL FREE IN CALIFORNIA

# The Micro Is the Message

Does the computer reflect

the principles and spirit of today's society?

Augarten explores this idea and others through the work of Canadian scholar Marshall McLuhan and his book Understanding Media.

arshall McLuhan was a Canadian professor of English with an advertiser's genius for the catchy phrase. In 1964, he published a brilliant, difficult, highly original book called Understanding Media: The Extensions of Man (McGraw-Hill), which put forth the astonishing idea that "the medium is the message." In other words, every medium, whether television or computers, communicates a powerful message of its own above and beyond its content. For example, suppose you painted the letters "U.S.A." across a piece of cloth and ran that up the flagpole instead of the Stars and Stripes. Both flags stand for the same thing, but their effects on the observer are quite different. "To translate the rich visual mosaic of the Stars and Stripes into written form," writes McLuhan, "would be to deprive it of most of its qualities of corporate image and experience."

True enough. But McLuhan, who died in 1980, pushes his theory of the primacy of medium over content much further. and his work sheds a great deal of light on the nature of computers. Anyone interested in the impact of computer technology should read Understanding Media. For McLuhan argues that the very character of a civilization is determined by the nature of its major media. Media warfare, not class warfare, is society's driving engine, and since he defines media as any extension of man, whether psychic or physical, Understanding Media is nothing less than an effort to establish a sweeping theory of historical development A civilization whose chief medium of communication is the stone tablet sees the world in considerably different terms from one that relies on papyrus; similarly, a society that depends upon the printed word looks at the world much differently from one that communicates by



Stan Augante

electricity. And those differences profoundly affect the way we think and live. I've written two books on the history of computers and electronics-State of the Art: A Photographic History of the Integrated Circuit (Ticknor & Fields. 1983) and Bit by Bit: An Illustrated History of Computers (Ticknor & Fields, 1984). Since the history of computers and electronics is a new field, with so many of the basic facts in dispute or unknown. I tried in these books to sort out the who, what, where, and why, and downplayed grand historical theories. Nevertheless, I kept an eye out for an overarching historical explanation, one

that could account for the many twists and turns in the story, and although I didn't come up with one, Understanding Media has put me on the right track.

First, let's take a closer look at the meaning of "the medium is the message," McLuhan's fundamental premise is that "the form of any medium, rather than its content, determines what is being communicated." For example, electric light is "pure information"-a medium without a specific informational content, unless the light spells out an advertisement. "Whether the light is being used for brain surgery or night baseball is a matter of indifference." Why? Because both activities are in some sense the content of electric light, and they could not exist without that light. Electric light turns night into day, a phenomenon that has innumerable practical consequences for all of us, from night baseball to brain surgery to 24-hour work shifts and windowless buildings. Thus, the medium is the message, because it is the medium that shapes and controls the scale and form of human action and association.

Like most great inventions, the light ball was a direct result of a particular way of looking at the world—a visual, linear, uniform, repetitive, abstract, rational frame of mind that stems from the very nature of our most potent and pervasive technology, the phonetic alphabet, As the pictorappish that constituted the first written words gradually gave way to the aphabet, in the bladdle East between the aphabet, in the bladdle East between that the properties of the properties of the mind was divocced from emotion. For Mind was divocced from emotion. For Mind was divocced from emotion.



701 Wast Glandala Ava., Suite 6, Phoanix, Ari: Technical & Other Information (602) 246-2222



\$98

\$75 \$630

Call

\$2450

\$449 \$399

Call

Call

Call

Call

Call

\$235

\$795 \$1020

\$359

\$685

value \$35. Available for most disk formats

Okimate 20 Color Printer...... Okidata 182 Microline.....

Okidata 192P Microline .....

Silver-Reed EXP 400 .....

oshiba P351.....

TERMS: Prices include 3% cash discount. Add

3% for charge orders. Shipping on most items

\$5.00 AZ orders +6% Sales Tax, Personal

check, allow ten (10) days to clear Prices

TOLL FREE ORDER	LINE 1-800-421-3135
DATA BASE	Microsoft Basic Compiler \$23:
MANAGEMENT SYSTEMS	Microsoft Basic Language \$225
Fox and Geller Quickcode \$140	FOR PC DOS
Fox and Geller OuickReport \$140	PC Paint Brush
Knowledgeman \$225	Norton Utilities
K Report \$135	Copy II PC \$2:
Condor III	Prokay \$6
Tim IV \$219	Total Harvard Project Manager \$25
DBasa Managar II \$165	Microsoft Flight Simulator\$3:
FRIDAY \$159	Think Tank \$90
PFS File \$78	HARDWARE
Nutshell \$55 RBase 5000 \$339	AB Printer Switch \$7:
CLOUT 2 \$129	Hayes 2400 Modem
Power Base Version 2.1	Hayes 1200 Modem Cal
WORD PROCESSING	Hayes 1200b Modem for IBM PC Cal
Wordstar Pro Pack\$238	64K RAM Chips (9) 150 NSEC \$7.50
	Anchor Express Modem \$245 IOmega Bernoulli 20 Megabyte \$245
Samna III	Princeton RGB Monitor
Wordstar 2000 +	Taxan RGB Vision 425
Leading Edge W/Merge \$85	
Microsoft Word \$225	FREE SOFTWAREI
Word Pertect \$199	With every \$100 purchase you will
Word Plus Spell Checker \$89	receive a free disketta for your IBM PC with label maker, checker game and
Volkswriter DeLuxe \$145	banner programs.
Random House Spell Checker \$36	
PFS Write \$78	COMPUTERS
Multimate \$210	IBM Computer Cal
Peachtaxt 5000	BOARDS FOR THE IBM PC
SPREADSHEETS	OR LOOKALIKES
Supercalc II	Hercules Color Board with Par. Port \$14
Supercalc III \$159	AST Six Pack with 384K \$28
Microsoft Multiplan \$119	512K Board with 128K \$14
TK Solver\$239	AST Advantage Board \$39
ACCOUNTING	STB Graphics Chauffer Board \$25
BPI Accounting Each Module \$325	Paradise Graphics Board \$259
TCS. Big Four equivalent of Peachtree	Ouadram Multifunction Board \$198
Series 4- GL, AR, PR, AP,CP/M-80,	PRINTERS
CP/M-86 for PC XT, DOS 1.1, 2.0.	FREEI PRINTER SET SOFTWARE
Each Module \$65 For All Four \$249	Purchase an Okidata, Epson, Gemini, Citi-
	zen, or Toshiba printer and receive at no
CYMACall	charge a menu driven program to set print
Dollars & Sence \$95	characteristics or to make your computer
MBSI Accounting (Real World) Call	function as a correcting typewnter Retail

Tobias Managing Your Money... \$98 TRANSFER PROGRAMS Hayes Smartcom ..... Call Move-it \$79 Microstuf Crosstalk XVI Microstuf Transporter ..... \$150

Nationally Advertised - Bast Price In U.S. for IBM PC or Clones Multifunction Board - Includes Async Adapter, Parallel Adapter, Clock with battery back-up and Software, 64K memory expandable to 384K, 1 year warranty...

LANGUAGES ifeboat Lattice C Compilar . . . . . un C Interpreter . . Microsoft C Compiler ..... Microsoft Pascal Compiler ......

subject to change SPERRY PC COMPUTERS

\$1650 \$1850

Gemini SG/10

Epson FX 80+

#### COMPUTERS IN SOCIETY

the alphabet is a convenient abstraction, a collection of arbitrary phonetic symbols that can be combined in an almost endless variety of ways to form words

. . . sentences . . . paragraphs . . . chapters . . . and books. By its very nature, the alphabet fosters a rational, visual state of mind, one that was greatly extended and deepened by the invention of the printing press in the fifteenth century.

Alphabetic literacy spelled the end of the oral tradition and the communal or tribal patterns of life associated with it. In their place, a new set of principles arose-individuals, abstraction, introspection, nationalism, and rationalism, The adoption of perspective in art, which occurred in the early fifteeth century, is one of the most telling signs of the change. Why did European painters dispense with a single plane of action and adopt depth of field? It's a great historical puzzle, and most historians chalk it up to the revival of the classical tradition, with its supposed preference for realism, that marked the Renaissance. But McLuhan contends that the switch was one of the consequences of the spread of literacv: "Only an extremely literate and abstract society learns to fix the eyes, as we must learn to do in reading the printed page. For those who thus fix their eyes, perspective results. The old belief that everybody really saw in perspective, but that only Renaissance painters had learned how to paint it, is erroneous."

What's Hot, What's Not McLuhan classifies media according to their "coolness" or "hotness." A hot medium extends any one of our five senses in "high definition"; in other words, a hot medium is one that is "well filled with data." Radio, newspapers. and the alphabet are all hot. Hot media require little participation on the part of the audience; for instance, radio, as an extension of the ear, doesn't call for much conscious attention on the part of the listener, and it serves quite well as background noise. On the other hand, a cool medium demands a great deal of audience participation. Television, telephone, computers, and hieroglyphics are all cool. "Any hot medium allows for less participation than a cool one," ex-

## Pascal<sup>°</sup> power booster.

## Run Lotus 1-2-3, Symphony and Sidekick without the floppy disk hassle.

# Creative cursor control.





## Turbo-Plus (Version 3)

Turbs-Plus." Is althrary of procedures crafted in assembly language and is designed to enhance Turbo Pacel." versions 20 and 30. No royalites are required for applications developed using Turbs-Plus." These procedures are extremely fiss and combine automatically with your programs. The benefit to you is rapid development turn around time and smaller, faster application programs. Turbor Plus."

includes:
Display Map Generator
Pop-up Turbo Reference Guide
Instant Text Display
Advanced Keyboard Control
Instant Text Retrieval

RamWindow
Enhanced Disk Input/Output Facility
Enlarged Graphics Character Display
Snow Removal
Sample Programs with Source Code
Printed Turbo-Plus
Reference Guide

Reference Guide

Version 5.0 update pulley: Receive full credit

(\$3-(95) (oward the purchase of Version 3.0)

unon roturn of prior version's priorisal diskette

\$59.95

## HardRunner\*

Run Lotus \*\* 1-2-3, Symphony \*\* and Sidekick \*\* directly from your hard disk without your system diskette in drive A.

Join thousands of satisfied customers who use this product and no longer worry about losing or destroying their system program diskertes.

We guarantee that HardRunner\* most absolutely no alterations to your Lotus." Symphony" or Sidekick. "programs HardRunner\* actually copy protects them on the hard diskente HardRunner\* requires less than 800 bytes of memory. (For the IBM PCNT/AT/ 5270, true compatibles, and TI Pro. DOS 2.0 or higher is required.)

\$39.95 \$69.95

## NoBlink / Accelerator

A key stroke initiated at any time pops up a window containing a wide range of NoBlink "cursors and cursor speeds to choose from, including the standard blinking cursor or standard cursor movement speed.

The NoBlink <sup>10</sup> cursors reduce eye fatigue and climinates the distraction of a blinking cursor. Chocoing a faster cursor speed will surprise you. It's a great time

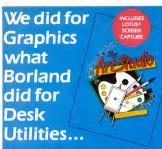
saver because it lets you move faster within your word processor or spreadsheet. Like the blinking cursor. NoBlink<sup>20</sup> is disabiled in graphic modes. (For the IBM PC/XT/AT/

\$39.95 \$69.95

To erder, call or write: Nostradamus, Inc. \$320 South 900 East, Suite 110 Salt Lake City, Utah 84117 Telephone (8011 261-0769 Dealer and corporate inquiries wetcome

# Nostradamus Inc. Software

		Sourcery
Please send me: Hard Runner \$39.95	Total amount enclosed \$	Name
☐ Hard Runner \$69.95 (Non-copy protected)	☐ Check ☐ Money Order ☐ Visa/MasterCard/Amex	Address
NoBlink \$39.95 NoBlink \$69.95	No	City/State/Zip
Turbo-Plus \$59.95 (Non-copy protected)		
U.S. shipping and handling included Outside U.S., add \$10.00 per item	Expiration Date	Nostrademus Inc. 5320 South 900 East, Suite 110 Salt Lake City, Utah 84117



Seeth Fines
Strike
Seeth Seeth



No. Con amb repair in Force is Swop Fill in Swop Fill in

## We made it affordable...

\$49.95

IBM PC, PCJr, XT, AT (and compatibles). I28K RAM, One Double Sided Spectrum Hakidiyle Disk Drive, Color Graphics Adapter, Graphics Monitor, Mouse or Tablet (optional), DOS 2.0 or higher

COMPUTERS IN SOCIETY

plains McLuhan, "as a lecture makes for less participation than a seminar, and a book for less than a dialogue." McLuhan believes that the impact of

electric media will rival the historical importance of alphabetic technology. Electric media of any kind, whether hot or cold, tends to deemphasize literacy and revive the tribal aspects of social life-a trend that. McLuhan believes, promises to bring the rampant alienation and anxiety of our age to an end. By linking millions of people together in an invisible electronic net, radio, television, computers, and other electric media have ushered in a "global village." As a result, the visual, rational thinking of alphabetic man is being replaced by "the multidimensional space orientation of the 'primitive." "In art, perspective has given way to cubism, surrealism, and other forms of expression: in physics, classical mechanics has been superseded by relativity; in music, the waltz has been drowned out by jazz and rock; in industry, the assembly line, with its crushing uniformity and repetitiveness, is being replaced by automation, with its easy ability to modify products to individual taste. We are gradually returning to the more united, more sensuous, holistic state of tribal man.

## Misunderstanding Media

McLuhan's philosophy is complex and subtle, and it's impossible to do justice to the depth of his vision here. However, before I discuss the message of computers à la McLuhan, I ought to take note of the shortcomings of his work. His ideas are highly subjective, often contradictory, and rarely based on tangible fact. His definitions of hot and cold are disappointingly murky and are made all the more complicated by the dual nature of most media. "Except for light," he writes, "all other media come in pairs, with one acting as the 'content' of the other, obscuring the operation of both." That being the case, it's a delicate, if not impossible, operation to separate the Siamese twins of media and content. Moreover, what was true of computers in 1950 isn't necessarily true in 1985.

Keeping all that in mind, what does McLuhan say about computers? Not much, unfortunately, for *Under-*

### COMPUTERS IN SOCIETY

standing Media was published a decade before the introduction of the personal computer. But it's clear that he regards the computer as the electric messiah. For example, "today computers hold out the promise of a means of instant translation of any code or language into any other code or language. The computer, in short, promises a Pentecostal condition of universal understanding and unity." Later on he declares, "Nonliterate societies had small use for numbers, and today the nonliterate digital computer substitutes 'ves' and 'no' for numbers. . . . In effect, then, the electric age brings number back into unity with

visual and auditory experience, for good or ill." And, finally, "In the computer age we are once more totally involved in

our roles. In the electric age the 'job of owth' yields to dedication and commitment, as in the tribe."

Of course, these statements are ridiculous—McLuhan wasn't given to understatement—but they do contain a germ of truth, even if you don't accept his oracular theories. Nevertheles, although I agree that the medium is the message, I think that he grossly misun-

MAC MICH WITH SEE MAN PO DOTH

derstands the nature of computers. Far from retribalizing us, the computer reinforces the visual, rational patterns of alphabetic technology. Nothing is more rigorously logical than programming, and using any computer requires a solid understanding of step-by-step procedure-the very pattern of thought emphasized by the alphabet. A computerized society is an even more relentlessly logical one than a civilization based on the alphabet and the printing press. The computer is alphabetic technology taken to the limit, and its invention was a mighty salvo from the literate, rational armies of Western Civilization. However-and this is crucially importantthe computer is evolving, and the visual. rational qualities that it currently fosters may eventually be superseded by a generation of machines that can walk, talk, taste, feel, and hear. And if that bappens, the computer will deemphasize literacy and, to paraphrase McLuhan at his apocalyptic best, help restore us to that happy

unity of the senses that supposedly characterized tribal man.

		Took
	HARO OISK	MONITORS & TERMINALS
	CORVUS 11 1 MS Develorive Starter Kit \$1645	AMDEK Video 300/300A/310A 8125/130/155
	45 MS Omeidrine S4145 Trimitine Combo (TLC) . SCall	
DMPUTERS		DUME AT Models \$Cal
M SYSTEM SPECIALS	No. of Street, or other Persons	ROLAND MB-1226 \$155 MB-142 SCal CB-141 \$269 CC-141 \$350
64,1 Driva 8 10 MR Hard		TAXAN
	Cut 905	115 \$115 116 \$121 429/L \$Call 440 \$355 TELEVIDED AN Models \$Call
	INTERBYNE Tape Back Up SCall ISBN1N Internal Tape Back Up \$549	WYSE
	DNEGA Bernouth 20 MB \$2499	ZEMITH 274 274 274 504
	SYSGEN Archive SCall	ZYM-135 \$439 ZYM-138 \$Cell Z-29A \$Cell Z-49 . \$Cell
82 2"H	TG-5025 I low low price I	SUPER SPECIALS  EPSON OX-10 SUMM
OFFRO AS Models	OUT MATRIX PRINTERS	DATA GENERAL DNE SCAL
ADING EDGE PC	Call CITIZEN AS Models SCall	DIGITAL LA-100
	Call MSP-10 \$329 MSP-15 \$489 MSP-20 \$Call MSP-25 \$Call	EAGLE All models
plotter, digitizer \$ AutoCAD	Call	#AYPRO 4 Plus 88 (8088) \$1505 \$8.WER REED EXP 500 \$250 TRANSTAR 130 (15" correspo) \$200
MG APC Us to 21% offi		2596TH
ica Assistant w/printer ( NFTH	Car .	Z200 AT competible . SCall Z171 80C88 Pertable . SCall
-151-21 w/10 MB Hard Disk	Cell Cell R75	Actobact ROM for Bernoulli SCot MISCELLANEOUS
R IBM PC/AT/JR & COMPAC	EPSON JX-80 Color \$480	RAM CHIPS 64K SET 80 256K SET SCH
A letta/letration/intoKey S	Call PX-85 \$350 FX-185 \$600 Call MEC P2/P3 Proventers \$505/5735	call for quantity pricing DOUBLE-SIMED DISKETTES 3M \$27 Dyson \$30
CHOR Mark XII S	Call OXIDATA 192 S359 Mt. 84P SCall 199 Obimata 20 SCall Pagement SCall	Manuff 525 Waltook 519
res unfreeden 1200/2400 EUASE	PANASONIC KX P1091 \$249	CUADRAM Microfesser Parallel Parallel NV 5100
	129 Germin 15X \$345 SG-10 \$229 58-10-15 \$Call \$R-15 \$619	540 \$185 1280 \$236 Senni/Senni Sen/Per Per/Sen
100/X100 \$245/2	265 TOSHINA P1340_\$560 P251\$1145	BK \$139 64K 5139 INT. STRUCT ShuffeBuffer 32K 5289 ACT Printer Optimizer SCall
	LETTER QUALITY	SURGE PROTECTORS
the state of	## 150_09.35 \$359.5729 Two:rige 5 \$Cell	EPO/CURITIS All models SCall NETWORK Wire Tree Plus \$39:555 EFMSINGTON Masterpieca \$Call
Parkette Comments	HEWLETT-PACKARD Laser Jet SCall BARBO 630 FTS-18M \$1779	EMERGENCY POWER SYSTEMS SOLA Min UPS SCAL
Dage.	990 1100/000 5Call	TrippLits 6C425-FC (425 Watts) \$275 SWITCHREXES DATASPEC At configurations
RESEARCH INC.	ELF 380 \$415 2050 \$668 a6 3550 \$1060 8850 . \$1495	COMPUTER ACCESSORIES  Data Deactors (All Models) . \$Call
MED (axp. to St2K) SC	SALVER REED EXP SOUSSO \$250/\$410	CUSTOMER SERVICE
COLES Graphics Card S2 r Card (NGB/Comp/Par) S1 METHEUS Promodon External S3		401-781-0020
NIO PCTurbo 186 w 128K S6	S GTCD At models SCall	ORDERS ONLY
ular Graphica Card . \$2 MEX Graphics Edge	ENTER COMPUTER Six Shooter 1779	800-843-4302
1. SCET/190297 SC VE Board (PC/AT) SC		000-040-4002

# **PRINTERS**

When PC Magazine decided to update last year's coverage of 120 PC-compatible printers, we never dreamed we'd wind up putting as many as 70 new printers through their paces. We were even more surprised when we discovered the overall quality of this year's batch. So we assembled a new buying guide worthy of these printers.

#### BY JOHN DICKINSON

If you relish competition in business, or anywhere else in your life, you should consider getting into the microcomputer printer field. You won't find a more competitive field in the computer industry, and, for that matter, you probably won't find more competition in any other industry. I even doubt things are tougher in the NFL.

Last year (Volume 3 Number 23) PC Magazine covered the entire field of PC-compatible printers by testing and reviewing 120 of them. If a printer was generally available and worked with a PC. it was reviewed in the printer issue.

Nine months later, PC Magazine's editors decided to update the printer issue by checking out products that weren't on the scene last year. We thought there must be about 35 new printers on the market for our reviewers to try out.

We were off—by about half.

To thoroughly update last year's printer issue, we had to put 70 new or significantly updated printers through their paces. And as it turned out, this year's printers were better overall than last year's.

If you're statistically minded, you've already figured out that 70 new printers means about 8 printers per month, or 2 per week, have been brought out by this feverishly active segment of the microcomputer industry. If you want some insight on what it's like to watch all this go by, see the sidebar "Printer Flood" by New on the Market edition Dave Obreeón.

In last year's printer issue, each product's review was accompanied by print samples, a photograph, and a ton of data about the printer. The machines in that issue ranged in price from just



over \$100 to just under \$4,000 and included everything from daisywheels and thermals to ink jets and lasers. We even separated color printers out for special consideration. In short, we presented a comprehensive buyer's guide to PC-compatible printers.

This year's printer crop has a technological range that's just as wide as last year's, but the price sweep is a bit wider. That's a lot of new printers to test and review and a lot of information to squeeze onto these pages.

But, once again, this issue has a great deal of information about each printer—almost as much as last year's, in fact, because we wanted to be sure that this issue brought your buyer's guide up to date. As a result, while the format of this year's printer issue has changed somewhat, the testing procedures and data are the same.

That means you can check this year's crop of printers against last year's on a consistent basis. The bottom line is that if you combine last year's printer issue with this one, you will have an up-to-date, definitive guide to a total of 190 PC-compatible printers.

## **Torture Tests**

How did PC Magazine test and rule printers in this issue? Contrary to popular belief, we didn't throw them out of our druth-floor windows, jump on them and then book them up to see if they would still m. Rather, we tried to have our reviewers simulate the situation you face when you first open the box of your new printer and hook it up to your PC. About the only thing addition would have been to lift our price of each printer out of the reviewer's wallet as it got unouscled.

working, the reviewer hooked it to a PC and ran our series of printer test programs. These programs are designed to test printer series for PCc orapatibility, print quality, and as speed in a software environment that simulates the printer drivers found in most popular word processing programs and other PC packages that make use of printers. Much of the data in the chart (page 183) was derived from these tests.

The CHARS program is the simplest on

After unpacking a printer and getting it

## CAST OF CHARACTERS

For six weeks, our intrepid reviewers worked feverishly to test the 70 printers in this issue. Now, we'd like to present our reviewers to you.

John Dickinson, the project manager for this issue, is a contributing editor at PC Magazine. A printer fanatic, he also orchestrated and oversaw last year's printer issue.

Dickinson was formerly an assistant vice president in the Financial Services Group at Manufacturer's Hanover Trust and a senior project manager for a management consulting firm. He is an adjunct assistant professor of Information Systems at New York University.

Jim Forney, a frequent contributor to PC Magazine, has tested and evaluated a wide variety of consumer products, from



hn Dickinson

computers to cameras, for a number of years. He's an inveterate tinkerer who has the uncanny ability to make almost any printer work, no matter how balky it

may be.

Charles Petzold is a frequent contributor to PC Magazine. In addition, he
works full time as the personal computer
coordinator for the New York Life Insurance Company, where the trains users,
assists in the development of applications, and programs on IBM PCs. He
was also a participant in last year's printer overview.

Vincent Puglia, the New York City Board of Education's editor for microcomputer books, is a frequent contributor to PC Magazine and Changing Times Magazine. He was also a reviewer for last year's printer issue.

Robin Raskin is a New York-based free-lance technical writer and frequent contributor to PC Magazine who specializes in educational and family computing issues. She writes for a number of computer publications and teaches technical writing at Baruch College. Hopelessly addicted to printers, she loves to test them out and is anxiously awaiting next year's crop.

M. David Stone is the author of a number of computer books including Getting More out of Wordstar and Mail-Merge, Getting On-Line, and, his most recent work, Kids and Computers. He is a frequent contributor to the pages of PC Magazine, particularly in the field of telecommunications.

Nancy Trespasz is a microcomputer sales consultant with McGraw-Hill. A graduate of Lehigh University, she keeps herself up to date about computers by taking courses at New York University is Information Technologies Institute.

the reviewer's diskette and tests the printor's compatibility with the IBM extended ASCII character set. CIFARS prints both meric characters and high-order characters set (unique to the IBM PC and compatibiles). All printers should be able to print the low-order characters because they are universal among ASCII-based computers. ASCII-based computers is to continues printing throughout the entire range of characters without crashing. Fully compatible printers are able to output the uppermost range of the IBM extended

character set. PC Magazine's SETUP program helped reviewers quickly determine what features are available on the printer and how well each worked. The program enables and disables printer features when the user enters command sequences from the PC's keyboard and prints output using whatever feature was enabled. Finding out what features were available and how to use them required reviewers to pore over the manuals in some detail and do some experimenting to find out what did and didn't work. In some cases, vendors supplied additional or corrected information about the printer command sequences required to use the features.

#### Compatibility Question

The printer industry is evolving toward compatibility by building printers that follow command sequences used by the most popular printers, such as the IBM Graphics/Proprinter, the Egson MXRX/FX series printers, the Diablo 630 printer, and the Qume Sprint series printers. If a printer is compatible with one of these formats to compatible with one of these formats noted in the chain conditions of them, thankfully, are), it is noted in the chain.

The QUALITY test program allowed each reviewer to pick which print enhancements would be used for the print samples that appear in the chart. The enlarged print sample for each machine was printed in "power-up default mode" (in other words, whatever print mode the printer is in when it is switched on).

Reviewers ran a graphics-compatibility test for matrix printers with dot-addressable graphics. After the DOS GRA-PHICS.COM program or a vendor-sup-

litied program use looked, a typied he than tust damped from the scene to the brister. The results ranged from full DSA graphics compatibility with no errors, to minor errors like overlapped or slightly inspaced graphics bars, to disasters in which the printer went dead or totally out inspaced graphics bars, to disasters in which the printer went dead or totally out scan has with BBM's new Proprinter or Okidata's Flug'n Play IBM-compatible printrs, the machine was declared compatible with DOS graphics. If we needed vendor to the printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of the printer of the printer of the scan printer of the printer of t

PC Magazine's SPEED program was used to test effective print speed. It is a simple program that times the printer as it

If you combine last

year's printer issue with this one, you will

have an up-to-date.

definitive guide to a total of 190 PC-

compatible printers.

does a commonplace task—printing a twopage business letter. All character counting and timing is handled by the program to minimize human error.

Our reviewers ran SPEED two ways. The first time, they used no print enhancement features. The second time, the reviewer chose some combination of features to enable. The first test indicates considered the second indicates how much the printer slowed down during print subsecue and down during print enhancement. The second test is more important for dor matrix printers because grint enhancement is often the second description of t

measurement (such as sizes and sound levels), from printer documentation or reviewer observation (such as compatibility with other printers), and by reporting what the printer vendors tell us (such as rated dba levels).

#### Considered Opinions

Whether you compare this year's crop of new printers to last year's or not, this issue of PC Magazine is the definitive buyer's guide for the latest in PC printing machines. You can find basic data including prices, sizes, and features, and you can examine the print samples in the chart where printers are listed in price orbits.

You can also find out how our reviewers felt about the new breed of printers by reading the individual review articles, which are also presented in price order starting on page 97.

In fact, so much information is available about each printer and we found so many high-quality machines in this year's batch that it was a tough decision to select the top of the line this year. You can see if you agree by looking at the Editor's Choice section followine the reviews.

You can also download the chart data (including last year's charts with updated prices) from our Interactive Reader Service (RS) bulled toward in the form of a I-VC, you can sort the data, graph is, and print it in any way that you think will help you make a buying decision. As an added bonus, PC Magazine's printer test programs will also be available on the IRS by the time this issues is delivered to your off-free or home. They are excetable files that the other control of the processor of the

But printer reviews and data are not all that this issue contains; there's more to the business of computer printing than just the equipment.

## Made in Japan

The growing Japanese penetration of the U.S. computer market is also worth a look. Microcomputer printers represent the Rising Sun's strongest beachhead in the U.S. computer industry. Jared Taylor ("Japanese Printers," page 2001 recounts the history of Japanese success in this market, pointing out key milestones, and telling you where Japanese printer makers may be going in the future. It's a fascinating lesson in Japanese business methods,

## PRINTER FLOOD

Life's hard enough for an editor at PC Magazine, so why do they have to come out with so many new printers each week? We're up to our buffers in press releases.

Leaving current on the state of the Apripare runter is like counting the grains in the bottom of an hourglass. This task is especially difficult if you edit a magazine section devoted to new product news. Every week at PC Magazine the postume brings another task to press printers from companies located in virtually every part of the globe. The list of new printers from complicated located in virtually every part of the globe. The list of new printers that we compiled in May show would have forced us to change the natural virtual to the printers from compiled in May the work of the printers from every insure that we will be a support to the printers from the compiled in May and Support for the half the printers for every insure that we will be a support to the printers for every insure that the printers from the printers

With laser printers, extended-function thermal printers, dot matrix printers, impact printers, and the Jekyll/Hyde Brother Twinwriter 5 that comes with both dot matrix and daisywheel printheads—it sometimes feels as though the only thing all those printers out there do is sit around, churning out press releases.

Cut in the second of the secon

for their multitudinous mechanical siblings. It is impossible to treat them all equally. But how do you separate the wheat from the chaff?

Well, first you eliminate old printers that have been given facelifts and a additional features (chances are those features should have been in the original machine anyway). That cuts the weekly number by about half. Still, a lot of new printers are left, and there's precious little oldiorial space to mention them. What next?

You try to eliminate true hardware from vaporwer. This is a lot harder than it sounds. Sometimes the manufacturer's advertisements and press releases give you a clue. Look for such phrases as "release after (come date in the dim hure)", "o", "be go imp production after (a trappet date we know they Il miss.)". Whose period the clue price from they large that we know they Il miss.) "How period they are the are they are they are they are the are they are they are they are they are they are they a

In one case—the Brother Twinwriter 5—two PC Magazine staffers actually saw the machine in action at a press conference churning out sheet after sheet of sample printout. When it came time to review it, though, the machine had vaporized. Ergo, it doesn't exist yet. (But we saw it, ddn't we?)

Grain by grain, these machines come and Grain by grain, these machines come added to the decide which ones best suit your needs. In the end, it's all of you who collectively make up the marketplace who decide whether a product should exist or not.—David Obreado

and it should be interesting to even the casual observer of the computer industry scene.

Also, three of PC Magazine's frequent contributors carnine leaser printers in a series of articles that cover some of laser printing's newest and most interesting top-printing shows and and the state of the state

You'll learn about the

legendary Canon laser engine and discover

that laser printers

aren't perfect. The

future of printing may

have a good look at some of the evolving alternatives.

A series of printer software reviews as-

sembled by Alfred Poor can help you get better use out of the printer you alter the printer you alter the printer Pout alter when the Alfred Poor can packages that do everything from set up your job refer better to grant packages of the printer is supported by the printer is supported printer in the printer in the

Whether you're looking to get more out of your present printer, buy a new one, or learn about lasers and other state-of-the-art printer technologies, you'll find what you want in this issue. We certainly hope you enjoy it.

## Alphacom Aero

Can high-quality IBM-compatible graphics and dot matrix printing be found for less than \$250? I would have said no before I tested the Alphacom Aero, but this little gem delivers on both scores. It's an honest machine that doesn't make a lot of grand claims—it just does a good job.

There are two keys to the performance of this little machine, a printhead that uses square pins instead of round ones, and a thin film cartridge ribbon.

Square pins are not new, but they give excellent print definition where characters are horizontal or vertical: it's like putting blocks in nice neat rows. Going around comers takes a little cheating—and if you look close you'll see that curves and disponsials aren't handled perfectly. But the quality is good enough for all but the fussiest

purposes.

The thin film carbon ribbon cartridge makes the little dots sharper than any cloth ribbon could possibly match. The special cartridges run more than \$8 a piece, but I feel such high performance on such a low-priced printer more than justifies the expense.

Alphacom's Aero isn't stings with exfreatures. It loosn't claim a letter quality mode, but its double-strike printing outdoes the so-called letter quality output of many printers. It causes you to lose about the same amount of speed as well. Its emphasized mode is different enough from the double-strike mode to make it stand out on the page. Underlining is also available for even more emphasis.

The Aero also supports the full ASCII character set, sports a bidirectional tractor, and handles six type pitches from 5 to 16.7 cpi. And it has foreign-language character sets and downloadable characters.

Setup was fairly easy, although the unit I tested wasn't completely Blad PC compatible when I took it out of the box. There are several liny switches (not DIP switches) under an easy-access panel on top of the printer. Since their functions aren't clearly documented, it took a little trial and error to find which switch was set incorrectly. After adjusting the switches and unning the printer off and back on again to

The Aero doesn't claim a letter quality mode, but its double-strike printing outdoes the letter quality output of

many printers.

clear its resident memory, I was off and running.

The Aero's one real problem was a fussy feeding mechanism. If the paper wasn't lined up just right, it had a tendency to jam. In a not-uncommon design, it passes paper fed from the back over a tractor that pushes it around and under the roller platen rather than pulling it through.

This requires some special attention, but once I had the paper path carefully aligned, I had no further problem.

Overall, I was quite impressed with the way Aero stacked up. If you have the printer equivalent of champagne taste on a beer budget, you owe it to yourself to check out the Aero. In fact, this printer merits your attention even if you could afford to spend more.—Jim Forney

### Okidata Okimate 20

The Okimate 20 is one of the printing world's most affordable joys. Vibrant color graphics and fine-looking correspondence quality print have never been oneatly executed, well packaged, and reasonably priced. The \$169 printer I tested was equipped with a \$99 Pig. "n Print module and color paint software to support either the PC or PCI's."

The Okimate 20 uses a no-muss thermal ribbon transfer print mechanism. The special five-color wax-coated ribbon cas-settes allow you to enter the Okimate's world of color without any telltate ink stains on your hands. The printhead's heat-sensitive elements actually melt these wax-coated ribbons onto the printed page.

Regrettably, while the Okimate itself is affordable, it has some very expensive tastes. The need for special thermal transfer paper to provide maximum-quality printents are proported by the printents of the pri

You can tack the Okimute 20 under an arm and easily waltz it from home to office, but this 6-pound printer is no weakling when it comes to features. Its full range of draft and correspondence quality modes produce output with a handsome, well-rounded font. For graphics, the Okimate 20 supports five different dot densitates.



Aero
Alphacom
Alphacom
Acustomer service address and
phone number was not
available at press time.
List Prices 5299
Dim: 4 6 7 × 15.1" × 12.1"
Weight: 11 lb.
Country: Jipan

GRGUE READER SERVICE NO 700



THE FACT FILE

Okimate 20 Okiudata Corp. S23 Fellowship Rd. Mount Laurel, NJ 08054 (800) OKIDATA (600) 235-2600 in NJ List Price; S169-509 for Plug 'n' Print modale Dim; 12 23\*7-7.5\*X 13\* Weight: 6.2 lb. Country: Japan

ties, including a fine line spacing (240×72 dots per inch).

While the printer is the size of a fat notebook, the documentation, luckily, is not. Using the brief but well-illustrated manual and the disk-based tutorial, novices can work their way through a hassleftee setup and color print installation. I've never had a printer get up to speed so effortlessly, and I've never had color printing the printing that is not printing the printing that is not printing that i

ing that was so easy to install. The color graphics software requires 128K and supports DOS 3.0. Hitting the PrtSc key invokes the Color Screen Print software. Using the software's menu selections, you can combine the Okimate's solid colors to create endless variations of halftones, quartertones, and blended hues. While IBM's PC color monitor and display card will print the traditional 4 colors, the software supports 16-color capabilities with display cards like the Plantronics. You can select the size and rotation of your printout and position the graphics on the printed page using single-stroke menu commands. The software supplied with the printer enables you to print any graphics produced by a graphics program.

The printer runs quietly, with the exception of the beamble but unusually used to whit of the mechanical paper feed. The color prints are created with labor-times sive ribbon spinning. The cassette ribbon is made of 3-in-flong segments of lyong segments of the made of 3-in-flong segments of the proportion of while the searches for the appropriate of a reasonably intelligent, they're also flower and two-and two-color mixes mades for a doll spectator sport. The easy-to-use software, slender but substantial design, glossy thermal output, mouth-watering selection of color, and access of installation made the Okinas cases of installation made the Okinas of the other printer. The sheen on a twery desirable little printer. The sheen on a talight-etch luster. Those with reams and printing to do might want sign of the printer that will use inexpensive paper. But for those users who prefer less quantity of the other printer that will use inexpensive paper. But for those users who prefer less quantity and more quality, this little Oki no doubt will be more than OK.

-Robin Raskin

### Juki Model 6000

Any letter quality printer that lists for under \$300 has to be of some interest to those on a tight budget. At \$295, the Juki Model 6000 just squeaks into that category.

6000 just squeaks into that category.

Probably the most appealing quality of
the Juki 6000 is its low noise level. Tool-

ing along at a mere 9.7 cps, the Juki sounds like a moderately fast typist, as opposed to a jackhammer. That's appropriate, considering that the printer's unimposing size and design make it look like a typewriter without a keyboard.

Listening to the Juki print, I occasionally get the feeling I can outtype it. But the Juki has the advantage in that it doesn't take breaks or make mistakes.

The Juki is easy to use, but that is most by because it doesn't do much. The documentation, too, leaves something to be desired. The thin I be page manual contains instructions and useful photos showing how to replace printwheels and ribbors, but even so, it is much too spare. It lists build's 21 command codes—but without supplying any discussion of each command, and without imparting the useful information that the control codes are a subsect of the Daible 630 command 640.

Also missing from the manual is the important information that the PC gives up printing with the Juki and returns a timeout error because the Juki is so slow. This annoyance can be fixed easily enough by entering this DOS command: MODE LPTI., P. Since Juki doesn't bother telling you this, however, you are left to figure it out for vourself.

A call to Juki convinced me that its product support has a little ways to go. The woman who answered the phone was both polite and helpful, but not very knowled degeable, and many of my questions were answered with, "I just have this spec sheet and don't know anything else." For now, I'll give Juki points for trying, and hope it sets better.



Model 6000

Juki Office Machine Corp. 28844 Hawthome Blvd., Suite 101 Torrance, CA 90503 (213) 373-9060 List Prices \$295 Dim: 5.5° × 15.5° × 8.5° Weight: 13.2 lb.

Country: Japan

CIRCLE READER SERVICE NO 696

With daisywheel printers, print quality is usually not an issue. But with the Juki 6000 it is. To begin with, a daisywheel printer should not need double-strike to give maximum quality. This one does. And with double-strike, the speed slows down to 4.9 cps.

There are problems with quality, at least with the single-strike ribbon shipped with the printer. Letters look broken and = uneven in quality. Also, you can see space within letters on the shadow printing. The quality may well be better using the cloth ribbon, but Juki did not send one for this

Another factor in evaluating daisywheel quality is the typeface. Juki ships only six type styles with its printer, but the printer can also use Triumph-Adler printwheels. However, Juki could not give us a

count of the total number of type styles. Overall, my reaction to the Juki 6000 is lukewarm. When you weigh its features against its \$295 price, the printer just doesn't make it. If the print quality were better, or the price lower, it might be appropriate for occasional use on a home computer. As it stands, though, the Juki is decidedly a ho-hum machine. It's not that there is anything particularly bad about it: it's just that there is nothing special, either -M. David Stone

## Okidata Microline 182 (Standard)

A dot matrix printer that costs under \$300 and manages to produce readable output should at least catch the eye of anyone on a low budget. And if that same printer zips along at a measured speed of 82.2 cps, it's worth some serious attention. The key phrase here is low budget. The

Microline 182 is an economy model, providing little beyond basic printing. It looks like an economy model, too-it's small and trim, but don't expect it to win any design awards. Print features include 10 and 12 cpi.

condensed and enlarged print, vertical and horizontal emphasis, superscripts and sub-



Microline t82 (Standard Okudura 532 Fellowship Rd. Mt. Laurel, NJ 08054 (800) OKIDATA (609) 235-2600 (in NJ) List Price: \$299

scripts, and underlining. Notably absent are a near letter-quality mode and compatibility with either IBM graphics or the IBM

high-order character set. Default quality on the 182 is readable, but nothing to get excited about. You can

The Microline 182's noise level is high, but

still tolerable-its pitch is low enough to avoid comparison with the

dreaded dentist's drill. try improving on it by printing in emphasized mode (horizontal emphasis). This

cuts the speed to a measured 60.6 cps and produces darker, more solid characters. but reading everything in boldface can become tiresome. The printer's enhanced print mode (vertical emphasis) merely offsets the dots to give a squiggly, out-of-focus effect.

The 182's noise level is high but still tolerable-at least in the large room PC Magazine used for testing. This has mostly to do with the pitch, which is low enough to avoid comparison with the dreaded dentist's drill. Unfortunately, manually rotating the roller produced a sound that does to me what squeaking chalk on a blackboard does to most people. This isn't a factor while printing, but if the sound bothers

you, aligning paper will send shivers down your spine.

The manual for the 182 is better than average-it's filled with useful illustrations and contains full explanations of each feature. All of this is sandwiched between

an index and a detailed table of contents. If you can't find what you need in the manual, Okidata invites you to call the customer service number. I tried the number and found a pleasant, informed person on the other end of the line.

Another point in this printer's favor is simply that I didn't run into any problems in setting it up or testing it. (The call to customer service was just a test run.) Certainly it has limitations, but for \$299, how much can you expect? If you're on a tight budget, the Microline 182 may well answer your needs .- M. David Stone

## Okidata Microline 182 (IBM)

If you're looking for an extremely lightweight, semiportable dot matrix printer that's compatible with 1BM graphics, the Okidata Microline 182 is worth a glance. It offers all the features you've come to expect in a dot matrix printer, and a print speed you can live with.

The Microline 182's print quality is a little above average for a no-frills dot matrix printer. And its throughput of 82 cps in draft mode and 58 cps in emphasized mode is quite respectable, especially considering the printer's lack of solidity. Print enhancements include the usual emphasized and enhanced modes, superscripts and subscripts, underlining, and condensed and elite modes. That's it. If you're looking for a correspondence quality mode, you won't find it in the 182.

For that matter, the Microline 182 doesn't even have an italies font. Instead, it has both sets of IBM characters and as a result is fully IBM compatible. The graphics screen dump went without a hitch. So, while you may not be able to print out a near letter-quality sales report, you can produce a good-looking chall.

product a good-to-kning citate-commend the RE, even't all you need if no is to knock out an occasional letter. The unit just doesn't look sturyle nough to handle even sensiserious printing jobs. I may be wrong. After all, I put i through its paces for a relatively short time. But, in comparison to other printers on the market and Okidata's old line, it just doesn't stack up. Or to putit another way: When I took Okidata's newest offering out of its box, I was templed ed to bring it home for my 11-month-old of one of this Fisher-Price toys, which, by the way, look a lot sturdier.

During the initial testing, that observation proved well founded: The cover blew off the top and sailed 6 or more inches into the air. I did manage to secure if for the rest of the testing, but I found myself watching it and waiting for the next uprising. Even the ribbon cartridge looks more like a toy designed for the 3-years-and-under set than it does like the old messy carbon ribbons Okidata is infamous for using. Also, while the paper did not jam during testing, I suspect it will under constant use. Therefore, if you buy the unit, I strongly suggest you also get the optional tractor feed.

Jou aso get the disconnect record rec

This Microline 182

doesn't even have an italics font. Instead, it

has both sets of IBM characters and is fully

IBM compatible.

Unfortunately, the printer's best feature is to documentation. By and large, it's clearly written and considerate of the novice user. The appendixes are especially helpful. One particularly helpful one is the de'Software Notes'; it gives the joint on using the printer with such applications programs as Visit Cole., SuperVoites. WordStore, and SuperWriter. Depending on the applications program, the notes install the printer so that the word processor can use most of the available features.

1 might consider using the Microline



Microline 182 (IBM)
Okidata
S52 Fellowship Road
Mt. Laneel, NJ 08054
(800) OKIDATA
(609) 235-2600 (in NJ)
List Pricer 5599
Dim.; 3.2" × 14.2" × 10.8"
Weightt: 8.82 lb.
Country: Japan

CIRCLE READER SERVICE NO. 696

182 as a portable or laptop printer—it is light enough to carry tucked under your arm between the Sunday edition of *The New York Times* and your briefcase—but I would never refinquist my old Egoon MX-80 with Graftrax for it. I know my Epson is capable of long printing jobs. I don't know if that is true for the Microline 182.—Vincent Puglis.

## C. Itoh ProWriter Jr.

"Ain't she sweet," I whistled when I picked up C. Itoh's new ProWriter Jr., an 8-pound dot matrix printer that will tickle your fancy with its whimsical design. Its print speed is slow, but its quality is good, and at \$299 if 3 an excellent printer for novices with minimal demands.

The most striking aspect of the Pro-Writer Jr. is its built-in printer stand. Unfold the printer's spindly little legs, and the ProWriter Jr. stands over your fanfold paper like a miniature arthropod, guarding it from harm's way. While the stand is not the most secure or heavy-duty printer pedestal system, it makes sure that the paper nile doesn't how your valuable table space.

The minute, spool-type printer tribon is a bit east yo in stall when compared to carridge ribbon. C. Indo nendoes a terry histor two terror below to without mucking up your hunds. A company spokesepson confided that to keep things small and simple on the Prowitter II, when seed to conserve seed a country of the printer design. Regrettably, that meant there was no room for a cartridge. The ribbon is the weakest point in the printer design, but it isn't all that bad.

The ProWriter Jr. is 100 percent Epson compatible. It follows Epson tradition and uses italics for its high-order character set. Unfortunately, unlike some of the new Epsons reviewed in this issue, the ProWriter does not have the IBM character set available as a selectable option.

The escape sequences for the ProWriter Jr. are so fully Epson compatible that there's even an equivalent of Epson's Master Select Mode sequences. These sequences let you choose a print mode, such



ProWriter Jr. C. Itoh Digital Prod 19750 S. Vermont St. Torrance, CA 90502 (213) 327-2110 List Price: \$299 Dim.: 3 9" × 15 2" × 11 3" Veight: 8.6 lb. Country: Japan

CIRCLE READER SERVICE NO. 695

as emphasized, compressed, or enlarged, with a single command and value.

Unlike that of the Epsons, the documentation on how to use this feature and others is terse and minimal. As a matter of fact, the writing throughout the documentation is stilted and awkward.

The ProWriter supports a proportional print mode as well as a sorrowfully slow near letter-quality print mode (13 cps for a dot matrix printer is slow by anyone's standards). However, the near letter-quality characters are very smooth and consistent considering the ProWriter's nine-wire plastic printhead. I didn't care for the printer's font, especially its undersized i's and curlicued t's. But then again, for the price, I would disregard the picayune details and live happily with this printer's near letterquality print.

The ProWriter Jr. handles screen dumps from the DOS GRAPHICS program admirably. As in the text, there's a nice evenness to all the graphics. In addition, the ProWriter supports a high-resolution graphics mode like that of the IBM and Epson FX series printers.

The most unique aspect of the Pro-Writer is its paper-feed and platen system. You feed the paper from the front straight across to the rear of the printer; pin sprockets keep the paper in place. The printer features both tractor and friction feed to pull the paper through.

The ProWriter Jr. impacts the paper on a plastic platen located at the bottom of the printer. I like to call that method "gravity" mode because the plastic printhead strikes the paper below it. One other interesting point is that the printhead has a ratchet that

efficiently. The unique design pays off. The paper

never jams, alignment is easy, and the impression is good. ProWriter Ir. users will sacrifice speed.

but they won't give up a shred of versatility. The printer offers a wide variety of print features and enhancements, including downloadable character sets, foreigncharacter sets, and extensive forms setups. The documentation gets no gold stars, but the low-cost, compact printer is so easy to use that it hardly matters .- Robin Raskin

## Epson Spectrum LX-90

Only Epson could blend "cute" and "quality" in the same printer. The brandnew Epson Spectrum LX-90 is an example of what I like to call "Epson's SLPs," or "sweet little printers."

The LX-90 series was introduced to replace and expand Epson's highly successful RX-80 series. Functionally similar to the LX-80, the LX-90 printer uses a plugin modular interface to accommodate various computers. At \$389 (\$329 for the printer and \$60 for the module), the LX-90 printer has many desirable features that should make it a welcome addition to any home computerist's collection. These include admirable NLQ (near letter-quality) printing, a reasonable draft quality speed. and some nice design features.

The LX-90's PIC (printer interface cartridge) is available for the PC, PCir. Apple pulls the ribbon back and forth quietly and He, and for a generic parallel port. Simply insert the PIC into the rectangular opening in the rear of the printer and voilà! instant compatibility.

> I was astounded when this Epson printer broke with Epson tradition and printed the full IBM extended character set. whereas previously Epson had used italics for its high-order character set. If you are a home computer collector, like me, and are looking for a low-cost printer that can give you the full IBM character set, the Epson Spectrum LX-90 may be what you need to solve your print compatibility problems. Just buy a few PICs.

The LX-90 incorporates Epson's timeproven F/T-a combination roller and tractor feed usable for single sheets. It is one of the best designs on the market. The printer also comes with a plastic paper separator.

But, despite all its good features, this printer handles like a toy in some ways that diminish its usefulness. A plastic carrying handle of dubious value emerges from the



## Spectrum LX-90 Epson America, Inc

2780 Lomita Blvd Torrance, CA 90505 (213) 539,9140 List Price: \$329 Dim.+5.1" × 16.6" × 12.4" Weight: 12.5 lb. Country: Japan

CIRCLE READER SERVICE NO. 604

rear of the printer. Besides that, the platen knob paper control is not especially smooth, the printhead runs up and down on something that resembles a thin rubberband, and the paper suffers from periodic crumpling and bunching on its path.

The printer's draft mode quality is adequate, but not exceptional. However, the near letter-quality printing is surprisingly good for a printer in this price range, but far from acceptable for normal business use. Unfortunately, the NLQ printing is executed at a turtle's pace of 16 cps.

However, thanks to its SelecType operation, the LX-90 makes selecting print features easy. To enable SelecType, you sim-

The Epson LX-90's near letter-quality printing is good for a printer in this price range, but not accept-

able for business use.

ply press the on-line, form-feed, and line feed buttoes on the front panel, using the print codes supplied in the manual to the print codes supplied in the manual to enter your choice. SelectType can specify NLQ, emphasized, double-strike, compressed, or eilipe print features, as well as print mode combinations. The LX9 dake that less you put together combinations of seven different modes with a single scape command. There are even escape sequences that allow you format your treat methods.

The LX-90's graphics mode is equally impressive. Fully IBM compatible, the LX-90 is also capable of downloading character sets and supporting seven different graphic densities. This little workhorse even has an outional sheet feeder.

A two-volume printer manual comes with the LX-90. The first volume, a pamphlet-size user manual, explains LX-90 setup and maintenance. The second volume is much more detailed and describes the PIC operations. Together, these documents provide an enjoyable and thorough look at the printer and its capabilities.

As evidenced by this very affordable entry-level printer, good things do come in small packages. All you'll need is patience as you wait for the LX-90's 16 cps NLQ print.—Robin Raskin

## CAL-ABCO Legend 1080

Aimed at the light- to medium-duty martet, the Legend 1080 is another one of a new batch of dot matrix printers that team square pins in the printhead with a carbon inbbon for clean, sharp text. Though it does a nice, crisp job on graphics, it would be better suited for computers other than the IBM PC because of a problem with the graphics.

This printer has no letter quality mode, but using the double-strike mode for text printing can produce a good imitation. In fact, the print is better looking than that produced by many comparably priced printers boasting a special mode for letter quality.

The use of square print pins gives a sharpness to characters, which are made up primarily of horizontal and vertical rows. While some compromise has to be made for characters with round corners, the losses are outweighed by the crisp rows. And, of course, that crispness is furnished.

ther enhanced by the Legend 1080's carbon ribbon, which much more accurately reproduces the shape of each pin than is possible with a cloth ribbon. Ribbon costs are somewhat higher than most, but it's worth the excense.

The Legend 1080 supports only the low-order ASCII set; it substitutes the Japanese-font Kana characters for the upper set. It also offers a software-selectable choice of six pitches from 5 to 15 cpi and

has downloadable characters.

Paper feed is bidirectional. You can use

Paper feed is bidirectional. You can use either friction-fed single sheets or fanfold paper, which goes through a rear tractor that pushes paper through the machine in its normal forward mode. While a little heavier and sturtier than some of the lightweight crop of current printers, I would like to have seen it a little sturdier for the price.

Setup was fast and easy. One switch that had to be reset might have been labeled better. The documentation, which includes numerous illustrations, was adequate.

The Legend 1080 has graphics capability but is not designed to be 1BM compatible. And it isn't. While it primed PC Mag-azine's standard graphics test patterns sharper than many machines I we seen, it will will be a support of the property of the BM PC market, unlike other machines are not intended primarily for the IBM PC market, unlike other machines in the company's line that are fully compatible with the IBM graphics protocols. In the capability of the property of the pr



## Legend 1080 CAL ABCO

CAL ABCO 6041 Variel Ave. Woodland Hills, CA 91367 (800) 4LEGEND List Price: \$339 Dim; 4.6" × 15.1" × 12.1" Weight: 111b. Country: Japan

the standard most other machines have adopted (960 dots).

If your computer is designed for the 640-04 (thorizonal) graphies matrix structure, the Legend 1080 is a real winner for both text and graphics. But the 1080 is only one of several new and in many ways, similar printers of leftered by Legend is similar printers of leftered by Legend is pushed by Capabille William of the pushed by Capabille William of the legend's PC-compatible models instead for a price anywhere near that of the 1080 a fully compatible printer would be a stronger contender— Jum Forney

## Axiom DX 2000

With its 13-inch carriage, the Axiom DX 2000 daisy wheel printer occupies the middle ground between the other printers occupies the middle ground between the other printers in the Axiom DX thriggs, Axiom's DX 1500 and DX 2500 are identical to the DX 2000 and DX 2500 are identical to the DX 2000 (which we didn't test) has the narrowest carriage of the three and the DX 2500 has the widest carriage (see its review in this issue).

Although there's nothing exceptional about the design features of this economical printer, it's got everything you would expect to find in a daisywheel, precisely where you'd expect to find it. And it was up and running moments after I took it out of the box. So why reinvent the daisy-wheel?

wheel?
The printer supports 10-, 12-, 15-pitch, and proportional spacing. You select the

pitch by using the front panel's "pitch select" button. An LED indicates the pitch

you select. It's too bad there is no autosensing mechanism so that the pitch selection could be automatically based on the currently mounted prinwheel. Since I always forget to change the pitch selection after changing wheels or resetting my printer, this convenience would be nice, but I suppose that's asking for too much from a \$399 printer.

When it comes to compatibility with other popular fully formed chancter printers, Axiom's designers made very intelligent choices. The Axiom DX 2000 is flower. The escape sequences are well documented and are listed in the manual in functional order. The printer uses a Qume-type printerly before the printer uses a Qume-type printerly and public Hyrve II compatible.

ribbon cartridge both laudable choices

Rated at 20 cps, the Axiom DX 2000 is not very fast, but its speed is comparable to that of other daisywheel printers in the same price range. On the other hand, the printer is quieter than most other inexpensive daisywheel printers. The sound is sub-ducd, eventoned, and nonabrasive—it's a daisywheel I could bear sharing my desk with.

The paper feed isn't too bad for a daisywheel roller, but recommended options include an auto sheet feeder and a tractor feed. If you wish, you can expand the DX 2000's 2K buffer to 16K. Like most daisywheels, the Axiom DX

Luce most dassy wheels, the Axtorn DA
2000 uses a 96-character wheel that does
not support any high-order characters. The
printer's programmable print features are
bold, underscore, double-strike, and sub-

and superscript. These few features fill the needs of the majority of users.

The documentation is not exceptionally good or bad. The information is all there, although the manual suffers from a lackluster writing style and an uninspired graphic layout.

For a limited time Axiom is offering its Optimizer kit when you purchase the printer and send in your warranty registration. You receive two extra printwheels, typewriter emulation software, and some discount coupons for popular software packages, which are nice to have, if you're just starting out with your PC.

At \$399, the Axiom DX 2000 gives you headache-free, fully formed printing. Its design is mundane and unoriginal, but the printer is easy to use and provides quality correspondence.—Robin Raskin

## Panasonic KX-P1091

The Panasonic KX-P1091 won't win any design awards for its looks because at first glance it appears to be a cheap Epson clone. It's one of the few printers I've seen that photographs better than it looks. From its uninspired design to its wire paper separator, it looks like a loof corners were cut. But, boy, does the Panasonic KX-P1091 work.

First impressions aside, this printer gave me some pleasant surprises. Setting up the KX-P1091 took little effort. Even neophytes shouldn't have problems with the cartridge ribbon and tractor feed. The paper separator has some potential for crataring confusion, but the installation instructions include such good illustrations that I can't imagine amone would misin-

terpret them.

The printer is both IBM Graphics and Epson compatible. In other words, enough software will support this printer so that any setup problems you may have are over the minute you plug the KX-P1091 into your computer.

The second pleasant surprise was the noise level. The KX-P1091 is certainly not the quietest printer I've ever used, but its low-pitched hum is quiet enough that I



#### DX 2008 Axion Corp. 1014 Griswold Ave. San Fernando. CA 91340 (818) 365-9521 List Price: \$399 Dim.: 6.9°×18.8°×14.2° Weight: 19.8 lb. Country: Japan

CIRCLE READER SERVICE NO 600



NX-P1091
Panasonic Industrial Co.
One Panasonic Way
Secureux, NI 07094
(201) 348-7000
List Prices 3599
Dinn: 4.5° × 15.9° × 11.3°
Weight: 14.6 ib.
Country: Japon

wouldn't mind sharing a desk with the printer.

The clincher, though, is the KX-Pi091's print quality. Granted, the default quality, at a speed of \$8.5 eps, produces the kind of eye-straining, squiggly characters that give printers a bad name. What's more, the emphasized and double-strike modes produce more of the same, only lad darker. But when I got around to testing the near letter-quality mode, I fell in love with this little brinter.

As far as I'm concerned, the KX-P1091 produces not near letter quality but rather true letter quality in this mode. You'd really have to strain to distinguish it from typewriter quality. Knowing that the test output was printed on the KX-P1091, I can convince myself that I see the tellitale signs of a dor matrix printer. But based on the

output itself, I wouldn't even think to look.
The print speed is only 19.3 cps in near
letter-quality mode, but the output is worth
each second it takes. And the graphics output on this printer is every bit as impressive
as the near letter-quality text.

On top of everything else good about his printer is the fact that Panssonic seems determined to give it solid support. A call to the company produced fast, courtoes, and knowledgeable answers. The company representative called me back to answer the two or three questions that weren't answered immediately. This may be because I was reviewing the printer for PC Magazine, but many other companies had promised to call back and never have.

One possibly bothersome feature is the print-mode switch, with which you choose standard, near letter-quality, or compressed mode (software also can control these features). This slide switch is located on the top left of the printer; you can easily hit it accidentally and reset the print mode. If I used this printer regularly, I'd tape the

switch down and ignore it.

I've been won over. At \$399, the KX-P109I is a dynamite little printer that deserves your attention. Take a look at the print quality and see if it doesn't make up for any lack of good looks or speed in the printer itself. If you don't like the way the KX-P109I looks, hide it under a paper.

bag. But don't pass this printer by.

-M. David Stone

## Alphacom Alphapro 101

Priced at just under \$400, the new Alphapro 101 offers letter quality dalsywheel printing in a price range once reserved for low-end, dot matrix machines. And this printer is not the lightweight you might expect for the money. Physically, it weighs in at 21 pounds. In terms of performance, it runs at over 16 cps and emulates Diablo 630 protocols.

Getting the 101 up and running was quick and easy, thanks in part to a cable that's tailored to your computer. The printerend of the cable terminates in a box containing the printer interface designed for your computer. This box them slips into a matching rectangular opening in the back of the printer. Interface cables are available not only for the IBM PC and its compatibles but also for various Apple computers.

Print quality for normal text was quite good. The standard enhancements, such as shadow and bold, held up well, except for underlining, which was a little ragged.

The Alphapro 101's styling is neat, modern, and functional. The operating controls and status indicators are conveniently grouped in a narrow panel on the

top front of the printer.

Documentation consists of just over 30 pages in two booklets. Such operations as changing daisywheels and ribbons are detailed with simple diagrams. Escape sequences (and alternate codes) are given for accessing the printer's many special fearments and enhancements, and a listing for a BASIC program is supplied to demonstrate them. However, the documentation did not explain how to implement the special control of the control

At review time, the paper-feed mecha-



Alphapro 10t
Alphapro 10t
Alphapro 10t
Alphacom
A customer service address
and phone number were
not available at peess time.
List Prices 3390 (plus \$29 for
interface cable)
Dim: 5.5° 18.9° × 11.6°

Weight: 21 lb. Country: Japan

CIRCLE READER SERVICE NO 690

nism was strictly a friction drive, and no optional tractor or sheet-feed attachments were available. Unfortunately, until one or both of these options become available, the 101 is effectively limited to handling cut sheets. Rather than buying first, I tend to take a "wait and see" attitude on promsied accessories for any new product—especially ones that are as important as these for serious printer applications.

I did encounter one peculiarity while testing the Alphapro 101: Our standard program for measuring printer speed caused it to do erratie form freck. Alphacom suggested that the way the Alphapro 101 counts lines of text per page when the probable cause. They gave me an escape code sequence to set the printer for the usual 66 lines per page. This strikes me as a backwards approach. The normal default backwards approach. The tormal default intalization required only if the cure wants to deviate from these torms.

At this time, I would give the Alphapro 101 a mixed review, based on the unavailability of what I consider key paper-feed accessories, plus what might appear to be some growing pains Alpha couldn't properiv explain.—Jim Forne

## CAL-ABCO Legend 1385

The Legend 1385 may prove to be the stuff printer legends are made of. Is print quality and versatility will dazzle anyone who doesn't believe that clean, crisp output can be produced by a low-cost dot matrix printer. At 5499, the 1794-inch-wide carriage body is a bargain. Totally IBM compatible, this printer is a welcome addition to the PC shopping list at that price.

The Legend 1385 has a nice, easy look and feel about it. Its handsome design includes a convenient paper guide separator. I happily put away my Swiss Army knife and magnifying glass when I saw the ultramodern DIP switches conveniently located on the front panel. The switches have been transformed into grippable toggles, which let you select a setting without performing



intricate surgery. My satisfaction deepened when the tractor and pin-feed arrangement worked easily and the printhead proved to be adequately adjustable.

My complaints about the 1385 surfaced when the plastic cover fell off the printer each time I ried to get at the innards, but with this year's batch of printers, I've come to expect these 'pop-top' fiascos. They seem to be something of a trend.

The printer comes with a standard 2K buffer, and during its introductory sales period an additional 2K add-on will be available for \$1.

The Legend 1385 uses a film ribbon, which sells for somewhere between \$12 and \$14. While it's true that film ribbons produce cleaner, brighter-looking print, they are significantly more expensive and have shorter lives than cloth ribbons. Although the Legend 1385's film ribbons have two tracks, allowing the user to get double life from the ribbon, I have reservations about a matrix printer that can't use a cloth ribbon for fart quality ripritouss.

The Legend 1385 needs two important pieces before it can become a serious contender in the printer market: The first is a better-looking manual, and the second is a true correspondence-quality mode.

The current documentation is the Achilles' heel of this printer. Rife with typographical errors and awkward wording, the manual is in many places a cryptic puz-zle. "Pakca" means pica, "duble' means oduble, and "srager" means square. In the switch-setting charts, phrases like "fixed internally" and "valid" are used when a simpler "yes" would suffice. Sentences are constructed so poorly that they are ac-

tually misleading. The escape sequences are documented correctly and completely, but not very clearly. This manual needs a rewrite before the Legend 1385 can be taken seriously.

The Legend 1385 has no correspondence quality printing. Enabling the emphasized, double-strike, proportionally spaced print features will produce a bold but smudgy-looking output. And this near correspondence-quality printing is painfully slow at 20 cps.

by slow at 2c.ps.
Other minor enhancements would be nice. I feel that reverse feed should always be an option on a printer, but the Legend 1385's unidirectional tractor makes rewinding the carriage knob an impossibility. Also, the platen knob is on the left side of the printer, an annoying placement that may further reflect the manufacturer's unconscious desire to make manual paper manipulation difficult.
The Levend 1385 has real cotential.

The proportionally spaced print, four modes of bit graphics, and wide paper-handling facilities make it worthy of consideration. But without a decent manual and a correspondence quality feature, it falls behind its like-priced competitors.

—Robin Raskin

## Citizen MSP-10

The Citizen MSP-10 is a new dot matrix printer with some impressive built-in features and a few built-in flaws. It offers full IBM PC compatibility, a near letter-quali-



MSP-10 Citizen America Corp. 2425 Colorado Ave. Suite 300 Santa Monica, CA 90404 (213) 453-0614 List Price: \$449 Dim.: 3.2" × 15.2" × 13.6" Weight: 11 lb. Country: Japan

ty typeface, a slew of type sizes, and one feature that may be a first-reverse-image

print. The reverse-image print feature does just what its name implies; it reverses output so that you have white characters on a black background. While it's a novel idea. this feature's utility is compromised. For one thing, the black border is printed on a set base line. As a result, letters with descenders have to "jump up" above the base line to be visible. And if you print an entire document with the reverse feature, you'll get thin, white leading lines be-

tween each line of text. The MSP-10 comes with fonts in virtually every size and type you may ever require. In addition to the emphasized and overstrike features, you get enhancements for underlining, superscripts and subscripts, and italic, elite, condensed, and enlarged printing. For business letters there's a high-quality correspondence typeface; it may not be the prettiest typeface on the market, but it is fairly wellformed. You even get a special graphics character set that includes such images as card suits, an airplane, a musical note, a truck, a running man, and up and down arrows. Presumably, this set is offered in lieu of a download character feature.

In draft mode the MSP-10 cruised along at a little over 86 cpi. When shifted into correspondence mode, it toured at almost 28 cpi. The printer was fairly quiet, rating a 72 dBA on the noise-level test. It came completely configured for the IBM PC, so there was no need to set the DIP switches, which are located inside the unit. (A better design would be to place them on the outside of the printer.)

Because the control-code sequences are Epson compatible, you should have little trouble installing the printer for use with your favorite word processor or using any of the font generator programs currently available. You can access the correspondence quality font by either using escape sequence codes or holding down the linefeed button while the printer is on line. Hitting it a second time switches the printer back to the normal dot matrix type font.

The worst aspect of the printer is the chintzy paper separator and top cover. Both are made of the thin, hard plastic so popular for today's low-cost printers, which makes the cover and the paper separator extremely light. Combine that with the fact that they both just sit passively on top of the printer rather than lock into place, and you have a design that is at best occasionally serviceable. For example, the paper-feed pins that are supposed to be held by their respective cuffs don't do their job; paper jams are the depressing result.

This printer deserves better.

Even though the manual provided was not the final version, it was full of helpful illustrations and seemed well-written and generally accurate. It included a print enhancement compatibility chart (something every printer manual should have but doesn't), and so you can see at a glance which features are compatible and which are not.

While not perfect in its present form. the reverse-image feature is likely to show up in more printers in the future. If you like to travel with the avant-garde, a Citizen is your passport. Otherwise, the MSP-10 is an above-average dot matrix printer that will suit the needs of most of the people most of the time.-Vincent Puglia

## Epson DX-20

Not content to be known as the "dot matrix king," Epson has entered the ranks of midrange daisywheel printers with its new DX-20. At \$459 and 20 cps, the DX-20 provides you with an inexpensive and handsome, but loud and slow, fully formed printer. Designed and priced for the home and small-business user, the DX-20 is especially worthy of consideration if the higher priced, more industrial strength daisywheel printers are beyond your

means The DX-20 sports many features typically found in more expensive printers. It is totally compatible with the Diablo 630, making it a natural candidate to run with



## 2780 Lomita Blvd Torrance, CA 90505

(213) 539-9140 List Price: \$459 Dim.: 5.27"×20"×13" Weight: 16.4 lb. Country: Japan

CIPICLE READER SERVICE NO. 667

most of today's word processing software. In addition to the 13 available Epson daisywheels, the DX-20 can accommodate standard Diablo daisywheels and Olivett ribbon cartridges (multistrike and singlestrike); these accessories are easy to find and reasonably priced.

The printer's wide carriage and its support of features like shadow, boldface, and proportional spacing make it a good bet for the small business that needs a variety of print styles. It also emulates the Diablo 630 plotting commands, which give it the capability of producing rudimentary graphics.

graphics.

The DX-20 has a surprising number of add-on options for a printer in its price range. These include an optional keyboard attachment, a 7K buffer, and tractor and sheet feeders. It's as if Epson were telling the user that it will grow as the user's needs grow. Packing all this into a 16-pound

printer is admirable.

What about the DX-20's less admirable qualities? For one thing, it requires a 50-pin Diablo API cable, an oddity in the PC environment. PC Magazine's well-stocked computer supply room had but one, hidden away in a corner.

Also, get your earplugs ready—the.
Also, get your earplugs ready—the
District Section of the section of the
District Section of t

In Printers are like caus—If you'ne going to spend a lot of lime driving, you'll want a comfortable one. If you're driving time and finances are limited, however, you might on for a less pricey one at the example of the limited, however, which have been been been been been been been with the DX-20. Despite its many not-worthy features, you will be uncomforted be behysting the DX-20's paper feed, listening to its rate-ta-ta-ta, and waiting for the not-to-of-lat print. If you're on a first into offen, and you have been been been been been often and you then the DX-20's. A people like the DX-20's and the live with the DX-20's. A people like the print was the print when the DX-20's and the live with the DX-20's. A people like the live with the live with the DX-20's and the live with th



## FACT FILI

ADS 2000 Antex Data Systems 2630 California St. Mountain View, CA 94040 (415) 941-7914 List Price: \$495 Dim.: 4.7"×15.9"×11.8"

Country: Japan

## Antex ADS 2000

The Antex ADS 2000 dot matrix printer comes right out of the box ready to plug in and start working. After a glance at the documentation, I had it up and running, and away we went.

Like most modern dot matrix machines, the ADS 2000 has more than one print density: one for draft quality, and a slower one called "fine" that fills in between the dots for a finer print quality.

The ADS 2000 features
a mode that will print
out the hexadecimal

listing of a file.

While the ADS 2000 doesn't make any claims to letter quality printing, its fine mode produces output superior to some machines that do. Like all of the printer's other features and enhancements, fine can be software-selected and deselected, and it can also be activated or deactivated by a button on the control panel. An indicator light by the button tells you when it is set.

The fine mode can even be selected by the panel button while the printer is printing a document, but the change will not go into effect until the end of the line being printed. Fine won't work with either elite or condensed type, however.

The Antex machine also features downloadable characters and a mode that prints out the hexadecimal listing of a file.

The ADS 2000 is no speed demon, but is seems solidly built and its noise-level figures are comparatively low. It offers a pretty standard range of print enhancements and generally does them well. Both emphasized and double-strike, for instance, can easily be discerned from the unenhanced fine mode. The clean graphics are IBM compatible.

The documentation is scellent and includes apple illustrations. The drawings covering how to set up the printer, install, the ribbons, adjust the printer head clearance, and so on are particularly excellent. The manual includes complete, detailed instructions on how to access all of the printer's many feature—it even has a page that shows beginners how to read and interpret the information given about the various control codes. And the 162-page book is wire-bound, so it laws one flat.

The documentation handles routine maintenance better than most manuals do. It even includes illustrated instructions for cleaning or replacing the printhead.

The printer's styling is clean and not boxy. Its low profile is enhanced by the use of a tractor near the back that pushes rather than pulls the paper past the platen.

The Antex ADS 2000 is really a sleeper. It's so easy to operate that you begin to take its smooth performance for granted. Whoever wrote the documentation made sure that a beginner would find it easy too, but the ADS 2000 isn't just for beginners. For the price I'd rate it worth a serious

look.-Jim Forney

## Axiom DX 2500

A wide-carriage, fully formed character machine for just under \$500 sounds like a great deal; unfortunately, the Axiom DX 2500 falls just short of the mark.

The DX 2500 is a nicely styled machine, with a low profile, simple lines, and an attractive, well-laid-out control panel with everything logically marked. And its design is more acoustically efficient than many pricier machines with comparable print speeds.

At 20 cps, the DX 2500 isn't going to win any races, but it'll do for most applications

The print quality of the DX 2500 is good, although the underlines were a bit ragged, most likely because the whole machine shakes rather vigorously while printing. The machine just isn't massive enough to dampen the sudden starts and stops of the printhead as it hits the paper.

The DX 2500 underlines word by word rather than in a continuous line, an approach that I like (although you may disagree). Its other print enhancements, including bold and shadow, are pretty much standard. It also does automatic line centering and justification, features not often found on such an inexpensive machine.

A friction roller is the standard paperfeed mechanism for the DX 2500. Optional attachments include an automatic sheet feeder that can handle up to 100 sheets with an automatic stacker and a tractor

mechanism for handling fanfold forms. The DX 2500 has an annoying habit of



## FACT FILE

FX-85 Epson America, Inc 2780 Lomita Blvd. Torrance, CA 90505 (213) 539-9140 List Price: \$499 Dim.: 3.9" × 17.4" × 13.7" Weight: 17.21h Country: Japan

CIRCLE READER SERVICE NO 684

beeping whenever it starts up and every time you want it to do something. Clearly the machine was designed to do this, but I can't quite figure out why.

For some reason the DX 2500 periodically dropped off line. It didn't always happen and had no apparent cause when it did-it simply stopped a number of times when printing a document. When I called Axiom about the problem, they were baffled too. Pressing the select switch on the panel put it right back in business, but this annoying inconvenience takes away from

the good qualities of this printer. Axiom's documentation is adequate and reasonably well illustrated. However, I didn't find features such as the printer self-test-which works-mentioned anywhere

Overall, I'd have to rate the Axiom DX 2500 as a near-hit. Unfortunately, its mostly minor problems prevent it from being a worthy contender among this year's crop of budget-priced fully formed character printers .- Jim Forney

## Epson FX-85

Is it possible? A low-cost Epson dot matrix printer that supports the extended IBM character set? Can I really select near letter-quality print at the push of a button on top of the printer? Am I dreaming? No, it's true: the Epson FX-85 can give you all this and more

The FX-85 is basically an upgraded FX-80. It incorporates mechanical design improvements made for the FX-80+ and adds full IBM Graphics Printer compatibility and near letter-quality print.

Only days before this printer arrived, the printer review team agreed that Epson would never give up its italic character set for IBM's line, block, foreign alphabet, and math characters. And they haven't, really, because the printer is shipped in Epson mode. However, either Epson mode or IBM mode may be selected at the flick of a DIP switch. All you need do is remove one screw on the printer cover to access it.

The Epson mode contains the familiar italic character set, with emphasized, bold, compressed, double width, and all the rest, plus a new commmand sequence that switches between draft quality and near The IBM mode is strictly IBM Graph-

letter quality.

ics Printer compatible. None of the Epson extras are supported. So italics, elite type, proportional spacing, and the near letterquality typeface are not available through control sequences while the DIP switch is set in IBM mode.



DX 2500 Axiom Corp 1014 Griswold Ave. San Fernando, CA 91340 (818) 365-9521 List Price: \$499 Dim.: 6.9"×21.6"×15.2" Weight: 25.4 lb Country: Japan

DIRCLE READER SERVICE NO 685

Don't be too disappointed yet, though,

### **Borland Introduces** the Laws of TURBO DYNAMICS

Laws That Work Like Magic. Whether considering technological excellence, or innovation in

areas such as pricing, not copy-protection, licensing agreements, site licenses, 60 day money-back guarantee -Borland is clearly recognized as the software industry leader. The following three laws of "Turbo

Dynamics'™ exemplify

our pledge for excellence.

T COPY-PROTECTED We will always offer not v-protected versions of our ware. Also, our licensing ement is now so sim that even a child can under

to be fast, powerful and to deliver an incredible price per rmance ratio. We only believe in absolutely superb soft at rock bottom prices.

#### Turbo Oynamics Applies to Turbo Pascal.

Borland's Pascal family of products is growing by leans and bounds. You can now join SRD LAW hundreds of thousands of users and enter the first in the industry! We are so sure that you will love our world of Turbo

Pascal programming. And remember, all three laws of

Turbo Dynamics apply to all Borland products.

#### TURRO PASCAI™ \$69.95

The industry standard. With more than 350,000 users worldwide Turbo Pascal is the indus-try's de facto standard. Turbo Pascal is praised by more engineers, hobb students and professional program than any other development o

Turbo Pascal is simple and fun to use. Pree Tuded on every Turbo disk with ready-toas an 8087 option for your number-crun Turbo Pascal is available today for most compute PC-DOS. MS-DOS. CP/M-80 or CP/M-86. A maine: "In its simplicity it ac

#### TURBO GRAPHIX TOOLBOX™ \$54.95

The Turbo Graphix Toolbox will give even a beginning programmer the expert edge. It's a complete library of Pascal procedures and functions. Tools that will

w you to draw and hatch pie chi bar charts, circles, rectangles and a ful ns and set we won't charge you any revalties. Rest -

GUARANTEE

This third law is actually a

software that all of our pro-

ducts now come backed with

guarantee. No questions a

a 60 day money-back

TURBO TUTOR™ \$34.95 From start to finish in 300 pages. Turbo ven if you've never area Turbo Tutor will get you started right away. A must. You'll find the source code for all the examples in the book on the accompa ing disk ready to compile. Turbo Tixtor might be the only reference on Pascal and nine you'll ever need

#### TURBO DATABASE TOOLBOX™ \$54.95

INTERNATIONAL

5 Scotts Valley Drive, Scotts Valley CA 95066 one (408) 438-8400 Telex 172373 CLE 150 ON READER SERVICE CARD



The printer can easily be switched between darft quality and near letter quality by using buttons on the top cover of the printer. When the printer is off-line, two buttons control form feed and line feed. When the printer is on-line, these same two buttons switch between near letter quality and draft quality. The setting does not survive power-off or a printer reset, but the change is so easy to make that you probably won't mind

The near letter-quality printing looks very good. It's so good, in fact, that you won't believe it came out of an Epson. The price of this higher quality is reduced speed. While the draft mode zips along at 80 characters per second, the letter quality slows down to a disappointing 21 cps. It's easy to see why. The printhead makes two passes in the same direction for maximum precision.

Other FX-85 improvements over the def FX-80 include better paper feeding. The FX-85 even makes it possible to figure out how to load paper without carefully following the manual's instructions. I had no paper-jamming problems throughout the testing, in spite of the fact that the mechanism still doesn't look like it will work right.

Depending on your perspective, the manual has either been improved or ruined. The FX-80 and FX-80+ manuals were probably the best printer user's learning tools in the industry. While the wealth of BASIC listings and dot pattern closeups were excessive for the "average user," a budding printer expert could have lots of fun with them. The FX-85 manual includes general printer information and BASIC listings, but it's been severely reduced in size. Dot-addressable graphics and downloadable characters now are covered by only one chapter each. Of course, this coverage is two chapters more than that of most manuals, but it represents a definite change in emphasis away from the advanced user.

The showdown between Epson italics and Big Blue graphics characters is over. Epson buckled under pressure and now provides IBM compatibility. The Epson FX-85 will undoubtedly be stiff competition in the printer marketplace.

—Charles Petzold

#### NEC PC-PR105A

The NEC PC-PR105A dot matrix printer (not yet released at the time of our review) sounds a lot like one of those obnoxious battery-powered toy dogs that go "yip yip yip" until you're ready to tear its little Duracell heart out. If this printer only had a little tail to wag, the effect would be complete. It's one strange machine.

What makes the NEC PCP 105A strange is its unique 16-pin printhead—all 16 pins are in one horizontal row spaced Od dots apart. At any time it may be printing parts of up to 16 characters at once, one vertical dot row at a time. Total printhead travel then is just 60-dot widths horizontally (//us he width of an 80-column page) until the printhead reverses direction and prints several 60-dot widths going the opposite way.

Instead of one fast "zezzezzi" white the printhead ravois should sinches to print a line, the NEC PC-PR-105A makes seven little "żaż ziż ziż ziżs." It makes one for every vertical row of dots in drat mode; two passes in letter quality mode. That's a whopping 12 ziżs per second more if you allow for space between ore jov ual low for space between one sole with seven for plant allow of space petween for plant allow of space petween for plant allow for plant allow for plant allow for plant for pla

Interestingly, this odd configuration does a nice job of printing both graphics and the ASCII character set. Except for the draft mode, print quality was excellent. The NEC PC-PR105A produced the best-

looking italics I've seen come out of any dot matrix machine. And the PC-PR105A also does all those little double lines in the high set of characters that so many popular printers skip over (if they even print the high set at all)

The price for this attention to detail is that the NEC PC-PR 105A is slow. In our standard test it did only 45+ cpi in draft mode and 27+ in near letter-quality mode, which, unlike in most printers, is its default mode.

The PC-PR10SA is factory configured for use with an IBM PC. It seems well built, and I liked the styling better than that of many of the current crop of printers. The top cover dampens the sound somewhat and also offers welcome visual relief from the basic box most printers are to some extent stuck with.

NEC calls the PC-PR 105A a "trinmode" printer. In offers drait mode, near mode". The new printer was a similar to the conmode. You can switch from one mode to another by changing DIP switches, and accessing them means taking the cabinet to apart. If you're not used to poking around inside printers or computers, you might not want to take on that task yourself. But that's a minor point.

My biggest concern with NEC's latest entry is the environmental impact. Despite the superior print quality the PC-PR IOSA delivers, I could not live with this machine, nor could my colleagues in the PC Lab, who likened the sound to a dentist's drill or the scraping of fingernalis across a blackboard. Considering its sound, slow speed, and list price, you can cross this one off your list.—Jum Forney



PC-PR105A NEC Home Products Div 1401 Estes Ave.

1401 Estes Ave. Elk Grove Village, IL 60007 (312) 228-5900 List Price: \$499 Dim.: 5.3" × 13.3" × 9.6" Weight: 15.2 lb. Country: Japan

CIPICLE READER SERVICE NO. 683

# Borland's SuperKey lets one powerful keystroke do the work of hundreds and helps keep your confidential files... confidential!

SUPERKEY TURNS 1.000 INTO 11Yes SuperKey can record lengthy kestroke sequences and play the back at the touch of a single key, Instanty, Like Magic, Say, for example, you want to add a column of figures in 1-2.3. Without SuperKey you'd have to type seven keystrokes just to get started. ["shift.@su-m-shift.("]. With SuperKey you can turn those? Investrokes just to get started.

SUPERKY BELPS PROTECT YOUR
CAPTIAL INVESTMENT. SuperKey, at
your convenience, will make
your screen go blank after a
predetermined time of
screen/keyboard inactivity.
You've paid hard earned
money for your PC. Superkey
will protect your moniton's
precious phosphor. .. and
your investment. This feature
alone justifies your SuperKey
murchase!

SUPERKEY KEPS YOUR 'COMFIDENTIAL' FILES ...
COMFIDENTIAL' Time after time you've experienced it: anyone can walk up to your PC, and read
your confidential files (tax returns, business)
plans, custome lists, personal letters...). With
SuperKey you can encrypt any file, even while
running another program. As long as you keep
the password socret, only YOU can decode
your file. SuperKey implements the
US. government Data Encryption
Sandard (DES).

SUPERKEY PROTECTS YOUR WORK FROM INTRUOERS WHILE YOU TAKE A BREAK. Now you can lock your keyboard at any time. Prevent

anyone from changing hours of work. Type in your secret password and everything comes back to life . . . just as you left it

#### THE CRITICS' CHOICE

"H's unquestionably the best new program Fve seen since Borland's SuleKick." Sighter Manes, PC Nagarins

"The encryption features were extremely easy to use because of some elegant incorporation of pull down menus and clear promps... SuperKey is a large amount of functionality in a small amount of code at a lose price." Weter Mastled. PC Test learn.

BORLAND
INTERNATIONAL
4585 Scotts Wiley Drive, Scotts Wiley CA 95066
Phone (460) 438-8400 Teles 172373

Computerve – GO BOR CIRCLE 149 ON READER SERVICE CARD Copyright 1985 Borland International Bi-1009B

SuperKey and MeKick are trademarks of Borland loverational, In: 12.5 is a trademark of Lotan Development Corp. IBM to a regretered trademark of International Base Machines Corp. S6995
The property of the prop

Sapones Sapones

CA 100 and 501 to Fell

Amount Exclusion

Amount Sapones

Control Control Card Sap Done

Card o L

Code Ced 184 ...

Code 6 Line 194 ...

See 20 ...

See 20 P. See 2



#### FACT FILE

Microline 192 (Standard)
Októdzin
532 Fellowskip Reud
Mt. Laurel, NJ 08054
(8091) OKIDATA
(609) 235-2600 (in NJ)
List Price: 5499
Dim.: 3.2" × 14.2" × 10.8"
Weighl: 8.8 lh.
Country: Japan

CIRCLE READER SERVICE NO. 662

#### Okidata Microline 192 (Standard)

From the Land of Shrinking Electronics comes a printer so small it can get lost under its own output. The Okidata Microline 192 is about one-ninth the size of Okidata's legendary 2410 and about one-eighth the weight. It seems like a scale model rather than a real printer.

For a machine this small, the print quality is very good—the default mode clearly outranks that of the IBM Graphics printer. Although the printer control sequences are not the same as those on the IBM printer, many word processors will provide installation for Okidata printers, so this is no real problem.

The Microline 192 handles the usual bold, emphasized, compressed, and double-spaced print modes, as well as such features as italic, proportional spacing, a correspondence quality, and downloadable fonts. The correspondence quality won't fool you into thinking you're still using a typewriter, but the typeface is surprisingly smooth.

The Okidata Microline 192 is fast too, just shy of 100 cps in the default print mode. That's over twice the speed of the IBM Graphics printer. The correspondence quality reduces the speed to 35 cps, but that's still decent.

The full extended IBM character set is supported, with the double-line graphics characters printed with single lines. The dot-addressable graphics are not IBM compatible, however, so you won't be able to do graphics screen dumps with the GRAPHICS program loaded.

You can select the Microline 192 print features through its Menu-Sctup system by pressing combinations of switches on the front panel. This is good for setting different print qualities or sizes at times when control sequences are not immediately viable, such as on the DOS command level.

The technical specifications and print samples make this printer look good on paper. But after working with the 192, I'd never consider buying one. Why? As I held this printer in my hands, sel it up for printing, loaded it with paper, worked the front-panel buttons, and began our test programs, no matter how hard I tried, I could not purge the word flimsy from my head

Small doesn't have to mean flimsy. Anyone who handles a Radio Shack Model 100, for instance, or the Sony Portable Compact Disc Player, knows immediately that these units are well built and sturdy. You can throw them into a totebag and

take them on the New York City subway system, and they still work.

But 1 cannot recomment the Okidata Microline 192 for the office, a crowded desk where things could fall on it, or a residence with children or even for adults who don't handle the peripherals with velvet gloves. Perhaps its true home should be in the miniature electronics wing of a modern industrial art museum, displayed under glass where no once ant touch it.

The Okidata Microline 192 is ideal if you want visitors to your home and office to come by and say, "Oh, how cute!" But I don't think it will survive use in the real world for long.—Charles Petzold

#### Okidata Microline 192 (IBM)

Following Coca-Cola's lead, Okidata has stirred things up by changing its traditional Microline flavor. The new Okidata Microline 192 replaces the older Microline 92. It offers enhanced print quality and marginally improved speed. The new printer is lightweight, handsome, and easy to install.

These improvements notwithstanding, change is not always for the best. The sturdy, well-built design of the old Microline 92 has been replaced by a considerably flimsier, if more attractive, design. While the print quality and speed have been marginally improved, the overall quality has slunk down the scale.

Gone are the days of the Plug 'n' Play,



Microline 192 (IBM)

Okidata Corp. 532 Fellowship Rd. Mr. Laurel, NJ 08054 (800) OKIDATA (600) 235-2600 (in NJ) List Prices 5499 Dim.; 3.2"×14.2"×10.8" Weight: 8.8 lb. Country: Japan

CIRCLE READER SERVICE NO 681

### Borland's SideKick Will Clear Your Desk In 30 Minutes And Increase Your Productivity By 50%

SideKick is a combination of seven desktop accessories, which makes SideKick the single most effective business tool. Just a keystroke suspends your application program, giving you a window into SideKick. Another keystroke brings

A FULL-SCREEN WDRDSTART-LIKE EDITOR

You may jot down notes and edit files up to 25 pages long.

you back to where you were.

AN ASCII TABLE > for easy reference

AN AUTODIALER for all your phone calls It will look up and dial telephone numbers for you (A modem is required to use

this function.) A PHONE DIRECTORY

for your names, addresses and telephone numbers. Finding a name or a number becomes

a snap.

A MONTHLY CALENDAR functional from year 1901through year 2099.

Instantly. It's that easy.

- A DATEBOOK to remind you of important meetings and appointments.

A FULL-FEATUREO CALCULATOR

ideal for business use. It also performs decimal to hexadecimal to binary conversions.

> COPY PROTECTED \$54 95

NOT COPY-PROTECTED \$84.95

"SIDEKICK deserves a place in every PC."

SOLTY ROY, PC WEEK "If you use a PC, get SIDEKICK. You'll soon become dependent on it " Jarry Paurielle, SYTE "SIDEKICK is by far the best we've seen. It is also the least expensive" Roo Mondfold, ENTREPRENEUR

In a simple, beautiful implementation of WordStar's" block copy commands, SIDEKICK can transport all or any part of the display screen (even an area overlaid by the notes)

display) to the not Charles Patzais, PC MAGAZINE



Phose (408) 438-8400 Telex 172373 CIRCLE 147 ON READER SERVICE CARD Copyright 1985 Borland International BI-1008A

Available at better dealers nationarde. Call (800) 555-2283 for the dealer Available at better dealers nationwide Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133 IBM®PC, XT, AT, IL and true compatibles. yes, I want the Best Please send me SideKick Copy-Profested \$54.95 nese prices include shipping at US crises. As toraign order, add \$10 per product ordered.

ICA res add \$3 30 tex per copy Quantity \_\_\_\_ at \$54.95 Not Copy Protected \$84.95 ICA 165 350 \$5 10 189 per CO Quantity \_\_\_\_ at \$84.95 Amount (CA 6th tor) ...... Payment VISA MC BankOrati Chack

INTERNATIONAL 4585 Scotts Valley Drive, Scotts Valley CA 95066

Okidata's answer to printer/computer compatibility. The new machine must be ordered in one of two flavors, either IBMcompatible or standard.

The light plastic cover falls off the printer at the touch of a fingertip, and the pin feeders are barely strong enough to keep the paper from being mangled. The optional tractor feed is a must for anyone desiring to keep the paper on track. Regrettably, the printer's subscripts and superscripts have been so reduced in size that they require magnification to be read.

We clocked the 192's draft mode at 98 cps (the old 92 did 90 cps). At 83 dBA, the printer is far from quiet, and in its graphics mode it sounds like a swarm of katydids

gone berserk.

Okidata has made some improvements and transported some of its best features to the new Microline 192. The text is clear and attractive, and the graphics are 100 percent IBM-compatible. They've replaced the Microline 92's grimy spool ribbons with no-muss cartridges that promise a print life of 3 million characters. The 192 has a quasiproportional spacing mode that lets you specify spacing between characters (unfortunately, the escape sequences were incorrectly documented in the manual). The correspondence quality has a darker, bolder look than the 92's.

Graphics can be output in double and quadruple density, and the all-points-addressable capabilities and unidirectional print make the graphics full and robust. Finally, an interesting Menu Select mode lets you choose print styles with various combinations of printer huttons. Pressing the line feed and the power-on switch simultaneously yields a printout of the Microline's current printer settings. By pressing the select button and a combination of other buttons, you can change the characteristics of the printer. For those who toggle between printer settings frequently, the Menu Select is quite helpful.

Print quality being equal, there was a time when Okidata printers outdid Epsons and other printers in the same price range simply because they were built better. This now appears to be history. The new Microline 192 has none of the solid, durable feel of its predecessor. From the lightweight platen knob to the teeny buttons on the

front panel to the ridiculous excuse for an access cover, Okidata sacrificed craftsmanship in refurbishing the now-discontinued Microline 92.

If the 192 were a bargain, the decrease in quality might be justified. In fact, the new Microline is just as expensive as its ancestor, and not as good a value.

-Robin Raskin

#### Star Micronics SG-15

A neat array of features for a price tag under \$500 makes the Star SG-15 from Star Micronics a strong contender for the home or small- to medium-size office market. Besides the text enhancements, downloadable characters, and full IBM graphics compatibility that you'll find in this nicely styled package, the SG-15 sports a 15.5inch carriage-a feature that most printers

in this price range don't have. Built for more than medium-duty use, the SG-15's busky-looking printhead has enough power to print through three-layer forms.

While print quality was generally good-especially in the letter quality mode-lowercase e's and a's tended to fill in when enhanced or double-strike printing was used. In the letter quality mode, underlines tended to merge with the bottoms of letters. Still, the overall effect remained quite acceptable.

The Star SG-15 is fully compatible with IBM graphics protocols as well as with the slightly different Epson set, which Star

Micronics calls Star mode. While the SG-15 doesn't produce the best graphics I've ever seen, it certainly does a creditable job of turning out a report with mixed text and graphics.

The printer has a built-in provision for creating macros to call up complex sets of commonly used printer function commands. This is an unusual feature and can be a real timesaver. A macro can contain up to 16 codes, each of which can consist of eight separate commands. A macro for double-strike underlined expanded text mode, for instance, combines eight separate codes into a single command, then stays in effect until the printer is turned off or until the mode is changed again.

Print speed for the SG-15 measured an ordinary 67.7 cps in data quality mode, and the noise level was not excessive. However, the machine's modest price and the wealth of features that it offers make "ordinary" look pretty good.

Documentation for the SG-15 is first class. It starts off with a discussion of what to consider when deciding where to locate your printer. The comprehensive 250-page manual has just about everything you'd want to know; then it still goes the extra mile to tell you how to get the most out of your SG-15 with word processing packages and other special applications. Instructions helpful to beginners carefully explain how to use the various commands: more-experienced users can use the quick summary. A small detail that many will be grateful for is that the manual is wire bound, so it lies flat.

On the negative side, I was less than thrilled at having to hard-thread the ma-



Star SG-15 Star Micronics Inc. 200 Park Avenue, #35 to New York, NY 10166 (212) 557-6440 List Price: \$499 Dim.: 5.8" × 21.3" × 12.4" Weights 27.10 Country: Japan



# The world's best selling monochrome graphics card for the IBM PC.

There are more Hercules Graphics Cards in more IBM\* PCs, XTs and ATs than any other monochrome graphics card in the world.

Over a quarter of a million demanding users around the world use a Hercules Graphics Card to improve the performance of their software. The Lotus' 1-2-3' Booster.

Consider Lotus 1-2-3. Hercules gives an off-the-shelf



copy of 1-2-3 the highest resolution possible

Address: 2550 Ninth St., Berkriey, CA 94710 Ph; 415 560-6600 Teles; 254083, Trad

on an IBM PC, XT or AT. More 1-23 users choose the Hercules Graphics Card to get crisper text and sharper graphics than any other monochrome graphics card.

And we bring the same performance to other integrated programs like Symphony, Framework, and SuperCale'3. But we don't stop there.

The Hercules Graphics Card

improves all kinds of software. Like Microsoft\* Word, a word processor that enables you to display text with sub-

scripts, superscripts and italics.
Or pfs: Graph, an easy-touse business graphics program
that converts your data into
presentation quality graphs.

Or Microsoft 'Flight Simulator, the high flying game for the overworked executive.

Or our own Graph X, a library of graphics subroutines that eases graphics programming.

Or AutoCAD, a computer aided design program that offers features normally associated with expensive CAD systems.

And we supply free software with each card to do hi-res graphics using the PC's BASIC interpreter. State-Of-The-Art Hardware.

State-Of-The-Art Hardwar The Hercules Graphics

Card gives you graphics resolution of 720h x 348v and a parallel printer port. Our unique static RAM buffer provides sharp 9 x 14 characters and flicker-free scrolling. Our exclusive safety features help

prevent damage to your monitor.
State-of-the-art custom IC technology delivers unsurpassed reliability. Ordinary graphics cards use up to 30 ICs to do what one Hercules IC does. By using fewer parts, we reduce the possibility of component failure.

Which is one reason we warranty the Hercules Graphics Card for two years.

Unbeatable reliability.
Advanced technology. Proven by over a quarter of a million users. Why settle for anything less than Hercules?

Call 1-800-532-0600 Ext 400 for the name of a Hercules dealer nearest you and we'll rush you our free info kit.

#### Hercules. We're strong on graphics.

chine's spooled cloth ribbons. In case you haven't come across a spooled cloth ribbon lately, they're no less messy. At least this one threaded more easily than some I've encountered.

Overall, I came away far more impressed by the way the SG-15 is built and the iob it does on graphics and text than bothered by an occasional ink smudge on my fingers. If you need a machine with a rich selection of features, take a look at the Star SG-15. Who knows, if you're lucky, one just might follow you home. -Jim Forney

#### Westrey 1

Printers and the words "Made in Japan" have a close association that is only occasionally disrupted by the appearance of an American printer worth writing about. The Westrex 1, a medium-priced printer designed for home or small-business use, produces handsome Epson-like text, supports a wide variety of character font sets. and can be easily installed on a number of different computers. While the printer is not entirely IBM-compatible, its text output and versatility are impressive.

Westrey is a Massachusetts-based subsidiary of Litton, and it has been manufacturing 40- and 50-column dot matrix printers for Electronic Cash Register, Point of Sales Systems, and ATM markets. The Westrex 1 heralds its entry into the 80-column dot matrix printer business. The Westrex 1 will be distributed as an OEM product, and it is entirely possible that you'll find this printer disguised by some different labels and logos in the future.

The Westrex I abounds with high-tech plastic. Its one-piece molded base construction sports fewer gears and subassemblies than many of its Japanese counterparts. The printer's underbelly is coated with a cushy layer of foam, which helps to keep the printer steady and quiet.

The Westrex 1's print ribbon is a whopping 1-inch-high, 16-yard-long Möbius loop, positioned so that the printhead pins strike about 95 percent of the ribbon during its lifetime.



#### Westrex I Westrex OEM Product 51 Penn St Fall Rover, MA 02724 (617) 676-1011 List Price: \$499 Dim.; 4" × 15" × 11.25" Weight: 5.8 lb. Country: U.S.A.

The Westrex 1 offers a full range of print features, with the exception of a true correspondence quality print. The italic, subscripts and superscripts, and elite characters are all well formed but very "matrixy-looking." The enhanced doublestrike mode is nicely executed, bold but

Programmers will relish the ability of the Westrex I to perform a hexadecimal screen dump, and let-setters will appreci-

Despite the choice of eight selectable

graphics modes, the

Westrex 1 is unable to

execute an IBM

graphics screen dump.

ate 13 different font sets in the printer's memory. The Westrex 1 uses a simple but adequate combination of pin-feed roller and undirectional tractor-feed paper mechanism that accommodates various

The accompanying documentation is complete, with a lengthy discussion of the enabling of the international character sets, and alternative interface schemes for computers like Commodore and Atari. It's obvious from the documentation that Westrex OEM intends to support as many different machines and locales as possible.

The documentation could have charted the control sequences with more concise, functionally grouped descriptions. My biggest gripe with the manual was having to rustle up a three-ring binder to keep the pages from scattering to the wind. I prefer manuals that are smaller and bound at the

PC users must proceed cautiously in Westrex 1 territory; many wrinkles lie undemeath the printer's smoothly operating facade. The printer uses short-line logicseeking technology, but its logic is obviously faulty, since it prints the last word on a line, and then the printhead continues to

the end of the platen At 58.5 cps in its draft mode, the Westrex I is slow by anybody's standards. The printer does not support the extended IBM graphics character set.

The Westrex 1's greatest limitations are evident when running IBM graphics. According to specifications, the Westrex I offers five Epson-compatible dot-addressable graphics modes and three proprietary graphics modes. The three Westrex modes facilitate various highly symmetrical graphics printouts with squarely proportioned aspect ratios. Despite the choice of eight selectable graphics modes, the printer is unable to execute an IBM graphics screen dump. There is a true incompatibility between the dump rates of IBM and Westrex printers.

The vertical line-spacing increment of the Westrex 1 is double that of IBM-compatible printers. Thus the results of a screen dump from an IBM graphics program are filled with blank line spacings. To compensate, you could halve the linespacing increment, using the printer's escape sequences, but this approach to IBM graphics compatibility invites headaches.

The Westrex I is not a bad printer, but it is certainly not the PC user's choice. Its lack of true correspondence quality mode, its failure to support the IBM extended character set, and its incompatibility with IBM graphics are three good reasons why aPC user might look elsewhere. For \$499, the PC user can find a better match.

Robin Baskin

#### Datasouth Personal Printer I

You can almost hear a friendly Southern drawl emanating from Datasouth's products. The Personal Printer I is no exception. And the company offers the most pleasant, helpful, and courteous support that you're likely to run into.

Datasouth's high level of support even extends to printer documentation, which offers such particularly useful features as a detailed index to the manual complete with a subject-by-subject list of commands. Unfortunately, the documentation and the vendor support are the best things about this product.

Problems with the Personal Printer I begin when you need to set the printer's defaults. The DIP switches are inside the machine, and so you have to take the printer apart to change the settings—a task that involves removing three screws to get the cover off, setting the DIP switches, then

wrestling with the machine to put the cover back on. It's not all that hard to do, but I don't enjoy spending 10 minutes doing something that should take only a few seconds.

The real problem, though, is that the Personal Printer's print speed and quality are just medicore. Default mode prints at an especiable, Pas, Gep; it is certainly adulted does, and the double-strike mode simply you can make cut most of the individual does, and the double-strike mode simply makes the does darker. Emphasized mode smears the does a bit, and, of course, double-strike mode combined with emphasized mode smears the dots and makes them darker as when

Print quality in near letter-quality mode is better, but it slows the printer down to 25.8 cps. And even in near letter-quality mode the letters are squiggly and look like they were made on a low-cost dot matrix printer. For the \$545 price of the Personal Printer I, you deserve better.

The Personal Printer's looks are also nothing to cheer about. This is a box, no more and no less. Nondescript is the only description that seems fitting.

On the plus side, sound is no problem with the Personal Printer I. There's a hint of a dentist drill whine, but the printer operates quietly enough so that the noise isn't annoving.

Overall, this printer's speed, quality, and general difficulty of use might be acceptable if it oots \$200-\$300. But at \$545 its competitors are the IBM Proprinter and the Epson FX-85. With that kind of competition, the Datasouth Personal Printer I is hopelessly outclassed.—M. David Stone

#### NEC Spinwriter 370 ELF

NEC, a company noted for the superior print quality of its office-duty printers, has now brought traditional NEC print quality and features to the PC/r market in the form of the Spinwirer 370 ELF daisywheel. What's more, this model is also at a junior price. And if you don't want to buy a PC/r just to have an ELF around, NEC's identi-

Despite its name, the

ELF is no mini little

thing. It's sturdily
built and is enough
machine to meet the

needs of many small

cal 360 ELF interfaces with most popular PC-compatible desktops, including a regulation PC.

The ELF is pleasantly quiet. Although

The ELLF is pleasantly quiet. Atmough the numbers for the measured noise from the ELF look average at best, the undefinable essence of the sound is much softer and certainly makes the ELF easier to live with than some other letter quality printers that happen to ring up the same numbers on the noise meter.

At a speed of 16.3 cps, the Spinwriter 370 ELF holds its own against many letter quality machines with higher price tags, fewer features, and often inferior print quality.

Despite its name, NEC's ELF is no mini little thing. It's sturdily built, and the carriage is wide enough to handle 13-inch forms with 11 inches maximum printhead travel. It's enough machine to meet the needs of many small businesses.

Paper feed proved smooth and easy with the simple but effective single-sheet guide supplied with the printer. An option-



Personal Printer I
Datasouth Computer Corp.
4216 Staurt Anadew Bibd.
Charlotte, NC 28210
(800) 222-4528
(800) 222-4528
Dim. 4-8" × 15.5" × 12.6"
Weight, 17.6. B. Country: Japan

GROLE REAGER SERVICE NO. ETB.



#### FACT FILE

Spinwriter 370 ELF NEC Information Systems, Inc 1414 Massachusetts Ave. Boxborough, MA 01719 (617) 264-8000 List Price: 3545 Dim.: 5.8° × 19.3° × 13° Weight: 21 ib. Country: Januar

000 000000000000000000

al tractor is also available for fanfold forms with up to two carbons.

Documentation for the ELF contains many excellent, detailed drawings along with brief descriptions that should pose little problem to someone setting up his very

first printer. The ELF itself is very friendly too. I The ELF itself is very friendly too. I know that term can be toosed around quite glibbly, but I can it think of a better description. Its codes for calling up special features and enhancements rank among the easiest to use. The controls are logically placed and well labeled. Labels by the combination bail/friction release, for instance, clearly call on the functions of its stance, clearly call on the functions of its fractions of the composition of the two for sheets. What an improvement this is over the cryptic symbols ranary mandraturers insist on embossing onto their printer covers.

Not only character pitch but page or form length can be set manually with buttons on the panel. Although programmable for custom sizes, the 370 ELF comes present for form lengths of 8.5, 11, 12, or 14 inches. Line and form feed are combined into a single button for simplicity, and unobtrusive indicator lights keep you posted on the status of things.

The bottom line with any printer isn't features or user friendliness—it's the print and its quality, and in this the ELF clearly excels.

This little ELF is a real grown-up printer. You'll be surprised at what some ELFin magic does for the PC/pr. And if you've got a PC that needs a little printer magic you should check into this guy's 360 ELF brother.—Jim Forney

#### Smith-Corona D-200

Who says a good thing can't get any better? Not SCM Corp. It just keeps improving on what was already a good printer design. Last year's printer issue included two of Smith-Corona's dot matrix printers, the D-100 and the D-300. Even though both machines had a graphics compatibility problem, the D-300 was picked as an Editor's Choice, and its upgraded version is even better (see the review in this issue). The D-200, one of the growing number of two-mode printers, wasn't available for review last year. Apparently the older D-200 version also had an IBM compatibility problem, but it's now a pretty good medium-priced matrix printer.

The upgraded D-200 offers lots of features and is fully IBM compatible. SCM solved the compatibility problem of last year's versions by including two modes of operation: standard and IBM. To set the

modes, you simply toggle some easily accessible DIP switches located near the parallel port.

This two-mode printer has more than its share of type modes. In addition to the now standard pica, italic, and elite forus, the printer offers a respectable near letter-quality typeface and proportionally spaced characters. It take includes elongated, concluded type enhancements. While the vast majority of the printer's abilities are common to both printer modes, some are not. For instance, in exchange for the IBM extended character sets, you give up the extended character sets, you give up to the proportional and near letter-quality print

Because the D-200 offers two modes, I had to run all the tests twice. It flawlessly printed the graphics test in the IBM mode. In standard mode, however, it dumped graphics screens with <sup>1</sup>/s-inch white spaces. It's obviously impossible to use only one mode for both operations.

The D-200 ran at a respectable 84 cps in draft mode for the speed test. For the near letter-quality speed test, it performed noticeably slower, at 23 cps. If you keep the printer in PC mode (where you can only use double-strike for a finished look), you gain only about 4 cps. Unfortunately, you may find yourself

fidding with those DIP switches more often than you would like. For example, you will probably want to run the D-200 in standard mode for word processing and in IBM mode for everything else, including graphics and screen dumps. For the printer's next version 1 hope SCM places the DIP switches but front, under a control pan-



## FACT FILE

Smith-Corona D-200 SCM Corp. P.O. Box 2080 Certland, NY 13045 (800) 448-1018 (800) 962-3000 (in NY) List Price: 5545 Dim.: 5° × 16.6° × 13.4° Weight: 17.4 lb.

Country: U.S.A.

el or, better yet, puts a big toggle switch on the front panel for switching from standard to IBM mode.

In addition to mode selection, you can use the DIP switches for setting certain characteristics as default settings. You can toggle a switch, for example, so that the printer always defaults to emphasized print rather than to the normal farlft quality. Can also set up the printer to print 132 columns—per line rather than the usual 80 columns—abon for heavy spreadsheet users. Fortunately, you probably won't want to change these settings to often

The D-200 documentation includes almost everything an experienced user wants. But its horizontal, two-column format will probably confuse novices; it is also far too cluttered. More white space and a conventional format would make it much easier to read.

Once again, Smith-Corona's D-200 is a good medium-priced printer that can perform double-duty as a correspondence printer and an IBM graphics printer. But, most important, it offers good user support. SCM seems genuinely interested instening to suggestions and providing a top-notch product to the market.

—Vincent Puella

#### C. Itoh M-8510 SP

The C. Itoh M-8510 SP is much improved over the C. Itoh 8510 SP tested for last year's printer review issue. It actually works, producing very reasonable-looking

draft quality text at an adequate 90 cps. The dot matrix primer is lightweight and easy to assemble, and it supports proportional print and houses the gamut of national character sets. Perhaps its best feature is the subdued sound level. Unlike many dot matrix printers, it runs quietly

When the M-8310 SP arrived for restaing, is paper feed was both obscured and dismally underequipped for the task. The pin-feed mechanism comes hidean under a pop-top cover at the rear of the printers a feed of the pinters and the pinters and the pinters and feed weeks before discovering the well-hidden pin feeders. In addition, once the mechanism was set up, I discovered that the springs on the pin feeds were simply on strong enough to hold the paper on its course. I foldled around a tiltue and bean paper feed worked nearly perfectly.

letter-quality printing, and the best quality to emerge from the machine was with its bold, or darkened, draft mode. This output is simply not adequate for most business correspondence and is especially unacceptable considering how many inexpensive dot matrix printers include near letter-

The M-8510 SP does not feature near

quality printing.
Although the M-8510 SP can create graphics symbols and bit image graphics, it is incompaible with IBM graphics and text graphics symbols. Therefore it cannot dump a graphics screen, or many measurems, from DSo or BASIC. Its graphics symbols are very handsome and versatile, but they aren't compatible with any others.

I've ever seen.
Interestingly, even the low-order char-

acter set for the M-8510 SP is slightly incompatible with the standard IBM character set. For example, the printer replaces the left and right brackets in the character set with the printer's mark and degree symbols. If you want to use left and right brackets, you have to pen them in. The command sequences for the M-

S10 SP are not Epson or IBM compatible.
The M-8510 SP seems to be an island unto itself, paying little attention to the emerging standardization in the printer world.

and substitution in the primer weeks.

After spending fill an blowner of that
begun to think my phone bill would come of
that
begun to think my phone bill would come on
the ante primerly. Italked to someone
who actually knew something about the
ASTIOSP but just at I was getting ready
to jet down the specifics, he told me the
ASTIOSP would soon become obsolete because C. Inch was about to introduce a new
even the control of the control of the control
that the control of the control
that the control of the control
that the cont

Someday the C. Itoh M-8510 SP may be a wonderful transportable printer because it is so lightweight and easy to assemble. At this time, however, it has too many problems—most notably, its inability to produce correspondence quality text—to recommend it. Hopefully, by mext year the new C. Itoh M-8510 SP+NLQ will iron out the remaining problems.—Robin Raskin

#### IBM Proprinter

I liked IBM's new Proprinter when I first saw it and guessed it had a price tag of about 5750. But I fell in love when I found the price was only \$349—and for an American-made dot matrix printer. The Proprinter packs a lot of features and heavy-duty engineering into a compact package that is surprisingly low priced, especially coming from Big Blue.

When I was setting up the Proprinter and found the printhead stuck fast in place, my first reaction was that I had overlooked some of the packing material. Finding that wasn't the case. I then took a look inside



C. Hoh M-8510 NP
C. Hoh Electrones, Inc.
19750 South Vermont St.
Torrance, CA 90502
(213) 327-210
List Price: 5549
Dim. 57 % 15.76 × 11.77
Weight; 9.8 lb.
Country: Japan

#### Low power

# omplete hard disk kit \$395

Comes complete with virtually the identical controller that's in the IBM®XT, and Xerox®warranties the hard disk for one year

# wuaranteed 100 percent IBM PC compatible

How can we offer this fantastic price? Simple. We buy in such volume that even the most avancious hard disk businessmen understand they have to give us the best price possible. We could pocket the difference, but we

Instead, we put the extra profit into our testing facilities. That's why Xerox guarantees our \$395 10 megabyte hard disk for

one year. Xerox knows, as our customers know, that we have an extensive testing program. Here is what we contribute toward giv-ing you the maximum hard disk

Best Drives Available First, we buy the best drives available. Sounds trite, doesn't right? Hardly. You should see ome of the junk we get in our labs. Some have such high failure rates that we even ques-tioned our own \$10,000 hard disk tester. But when we tested other manufacturers drives we were assured that our equipment was fine, which just confirmed that the bad hard disks were not only

bad-they were real bad. But that's just the weeding out process. We then take each drive that we've put through our tester and test it again with the control-ler you've requested. We call this

DOS Doesn't Do It In case you're thinking that all | spending hours retesting.

this is an unnecessary duplication of what DOS does for you, let me explain the disk facts of If DOS did what you may

hink it is supposed to do when you format the disk, DOS would map around these bad areas. Unfortunately, DOS doesn't do

DOS 2.0 and 2.1 can't enter the bad tracks. DOS 3.0 can, but only on the IBM AT. Unfortunately, as the press has so well documentated, the AT's hard disk develops bad tracks later

#### We do what DOS can't

We believe the problem is so bad, we use a software program that performs a powerful test of your disk drive on all of the IBM or IBM compatible computers— PCs, XTs, and ATs. Our format takes hours to analyze the disk. But when we finish, you know that the bad tracks are really mapped out so you won't write good data that will disappear into a black hole. We even send you a printed statement of our test results.

Our software allows you to type in the bad track locations from the list supplied by the manufacturers, so you'll never write good data to them—even if DOS didn't identify them as bad. The software even lets you save the location of these bad sections to a file, so that you can

We even include a program that will give you continuous comments on the status of your hard disk. No more waiting for that catastrophic failure.

Average Access Time As you might suspect, some hard disks are faster than others in their ability to move from one track of data to another. The time it takes the hard disk to move one-half way between the beginning of the disk to the end is called the "average access

The first generation of 10 meg-abyte hard disks had average access times of 80-85 milliseconds (msec). But computer users love speed, and guess what—the average access time for the new 20 megabyte hard disk in the IBM AT is only 40 msec. (We sell an AT equivalent with only 30 msec

access time!) There are some legitimate rea-sons for the shorter access time. It's particularly helpful when there are multiple users on the same hard disk. It's also important when running a compiler. But remember, before you get too wrapped up in the access speed, there's always that ST 506 interface which won't let data transfer from the hard disk to the computer any faster than 5 me-gabits/second. We've bypassed that choke hole, too. If you want the functional equivalent of a Ferrari with a turbocharger, or-der our 10 Mbit per second 100

megabyte hard disk with 18 msec of average access speed.

#### Compatibility

100 percent compatible with the IBM XT you don't need to buy the same hard disk that's in the XT. You can't even be sure what brand hard disk it is because IBM, like Express Systems, goes into the marketplace and buys However, they buy their XT hard disk controller from only one vendor—the same one we

You can buy the IBM XT con-troller from IBM for \$495 or you can buy from us, the functional equivalent, manufactured by the same company that makes it for IBM for only \$195. Is it the exactly identical IBM XT control-ler? No, it's better. First, it takes less power, and secondly, it can control from 5 to 32 megabytes—the IBM controller can work with only 10 megabytes. It is 100 percent IBM XT compatible, and 100 percent is 100 per-cent. If you want to save a slot, we carry a version that lets you operate two hard disks and two floppy disk drives.

More than 32 Megabytes

32 megabytes (the limit of DOS) through the use of "device driv-ers." Express Systems can supply you with device drivers for our hard disks for over 32 megabytes formatted. But, if you don't have individual files, or databases that movioual nics, or databases that are large, you might want to con-sider one of our controllers that can divide our 65 megabyate (formatted) hard disk into two equal volumes of 32 megabytes each.

#### Reliability

We offer you a choice between iron oxide and plated mediathe stuff that covers the hard the stuff that covers the hard disk and gives it its magnetic properties. Iron oxide is,—well, it's rust. If you inadvertently joust your disk, you may cause the low flying head to dig out some iron oxide. A little rust flake can ruin your whole day. damage, and if it happens, less data is lost.

We offer both types of hard i







technology, and quite frankly, manufacturers understand it better. Their better understanding, combined with some of the special head locking mechanisms, gives us peace of mind when we sell you one

Power

Hard disks consume power. Our small, half-high hard disks consume so little power that you can use them with your existing IBM PC power supply. If you plan to use lots of slots, you'll want to increase your power supply to be safe. We offer the same amount of power for your PC that comes

#### **Our Customers**

Some folks just never feel comfortable buying mail order. They forget that Sears began as a mail order house or that IBM is now into mail order. But, if it helps, here is a partial list of eustomers who have felt comfortable to huy

**IBM** American Express Honeywell U.S. Army

AT&T (Bell Labs) RCA Lockheed Easy to Install

If you're like most of us, raised on the book tube rather than the Great Books, you'd rather see the movie than read the book. Well, now you can choose to read our installation manual or for only \$9.95 more, you can get a VHS or Beta video cassette showing the simple steps for in-

stallation



Our VHS or Beta Cassettes make installation easy.

#### Warranty

We offer you a one year warranty on our hard disks-the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If



anything goes wrong with your tane or disk drive or hard disk.

send it back in the box it came in.

However, we have found that we can usually solve the problem over the phone. So call first for a

return authorization number be-

cause we can't accept any returns

Comes complete

All Express Systems products come complete with the appro-

disk controllers, and cables where required. Hard disks are

formatted and tested with the PC

DOS of your choice. All drive

other variation, we'll supply

We even ship our hard disks with Command Assist TM an on-line

DOS-like manual to give you

help with your DOS commands.

these items at a nominal charge

sizes are formatted capacities. If your application requires a stacking kit, power splitter ca-bles, daisy chain cable, or some

priate software, tape and/or f

	Remo	vable Hard	Di
	100	Full	y
	65	Full	n
The second secon	32	Full	ī
	32	¥2	,
	21 32	Full	í
	21	V2	ý
	10	1/2	y
· · · ) ]	10	5/2	



no	85 msec	5 Mhits/s	
1/05	85 msec	5 Mbits/s	
ives	85 msec	5 Mhits/s	
no	30 msec	5 Mhits/s	
ves	85 msec	5 Mbits/s	
no	30 msec	5 Mbits/s	
no	30 msec	5 Mbits/s	
yes	18 msec	10 Mbits/s	
isk			



PC or PC/XT

495

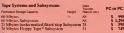
AT

\$ 1,295

\$35,00

\$75,00\*

\$125.00



All of our hard disk and tape controllers are available separately: Please call for prices

Subsystem Chassis Any of our disk or tape units are available in an external subsystem for an additional \$250.00. You can mix & match any of our 1/2 high hard disks or tape drives together or add any single full height hard disk

Tape Cartridges Express Certified 555 foot 310 Hei 1/2-inch Data Cartridge Power Supply

130 Watt Power supply 150 Watt Power supply with the purchase of any drive

Formatted Storage Capacity

#### More questions?

Because we spend so much at-tention on the front end with ensuring that our disks will arrive in working order, we have a cus-tomer service department that, unlike many of our competitor has little to do. When you need us, you won't get a constant busy

signal. Call our friendly, knowledgable customer service staff to get answers to your questions-before or after the sale. Our people, who know the PC, can talk you through the sticky parts, and they'll respond to you quickly

#### How to order Pick up the telephone and call I-800-341-7549, to order. We accept Master Card, VISA, Amer-

ican Express and Diners Club. Or send a cashier's check or

money order (We'll take a check, but you'll have to wait for it to clear) and tell us if you want one of our recommended configurations or you want to mix and match yourself. Corporations with a DUNS number may send

purchase orders for quantities

#### Call Toll Free 1-800-341-7549 Ext. 1200 In Illinois call (312) 882-7733 Ext. 1200

Just call us.

Express Systems, Inc., 1254 Remington, Schaumburg, IL 60195 CIRCLE 160 ON READER SERVICE CARD







1BM Corporation Contact your local authorized RM dealer List Price: \$549 Dim.: 5.2" × 16.5" × 14" Weight: 17.5 lb. Country: U.S.A

CIRCLE READER SERVICE NO 674

and quickly discovered the "problem." Instead of the usual little steel cables to pull the printhead back and forth, IBM has used a heavy-duty lead screw in the Proprinter.

As the name implies, a lead screw is a screwlike device, in this case almost as long as the printer is wide. The printhead then is attached to a nutlike section that rides back and forth along the lead screw when the screw is turned.

I've seen lead screw assemblies used in printers before but generally in bigger. higher-speed machines. The more I looked at this machine, the more heavy duty it looked overall for its modest dimensions. It appears to be built to last. And interestingly, I was told it has fewer than 60 moving parts.

The Proprinter doesn't have a conventional friction roller. Instead, a pair of pinwheels drive (push) the paper past a fixed platen. Without a roller platen in the way, the pinwheels can be set anywhere on the square shaft that drives them to accommodate tractor-type forms up to 10 inches wide. My initial reaction to that was less enthusiastic than to the lead screw. In practice, though, I found this mechanism worked just fine. And it saved the space in the machine that would be required for a separate roller platen and tractor.

If you run out of paper, the Proprinter lets you know by playing a little tune. In fact, it has several pleasantly melodic signals to get your attention.

The Proprinter also has a rather unusual friction feed provision. You can feed in single sheets and even envelopes through a slot in the front of the printer. Here a friction drive carries them to the fixed platen by a feed path separate from that used for

Print quality was good to excellent through the full 256-character ASCII set. IBM substituted a near letter-quality mode in place of the double strike found on the older Graphics printer, and it certainly is near letter quality. The emphasized mode is distinct enough from near letter quality to make it stand out when desired. Graph-

The Proprinter has one print enhancement not generally found on printers. It can both underline and overscore, separately or together. For my money, though, they could have saved the effort. I found that overscore merged with the tops of standard pica capitals.

ics were also notably good.

Overall I was impressed by the Proprinter. IBM clearly hasn't lost the knack for innovative, cost-effective engineering. This little darling is sure to turn a lot of heads, especially as news of its envelopehandling talents spreads .- Jim Forney

#### Dynax-Fortis DX-15XL

Some printers look so good when you take them out of the box that you instinctively know they are going to perform well. The Dynax-Fortis DX-15XL daisywheel printer, with its classy modern look, is just such a machine. Nearly everything with this printer works the way it should-from easy setup to high-quality output.

Print quality should not be an issue with a daisywheel printer, and indeed, with the DX-15XL it is not. Unlike that of some low-cost members of the breed, the output from the DX-15XL looks every bit as good as output from printers that cost from \$2,000 to \$3,000. The one exception is the underline feature, which has a slight zigzag look to it.

What you usually give up with the inexpensive daisywheel printer is speed, but with the DX-15XL, even its speed is a pleasant surprise. At 18.4 cps the default is actually faster than claimed. While I wouldn't want to print a series of long books with the DX-15XL, it is more than adequate for printing a letter or an occasional long report.

Another pleasant surprise is the way the DX-15XL sounds. The noise level is relatively low to begin with, but the qualitythink of Superman as a typist-makes it a much more pleasant office companion than most daisywheel printers.

The DX-15XL is easy to use thanks to its subset of the Diablo 630 command codes. That also means that most word processors will support the printer with no



# DY-15Y1

Dynax-Fortis 6070 Rickenbacker Rd Commerce, CA 90040 List Price: \$599 Dim.: 6.6" × 17.75" × 13.25" Weight: 19.6 lb. Country: Japan

CIRCLE READER SERVICE NO. 672

# The Project Scheduler **NFTWORK**



planning. You can't afford to overlook critical costs and deadlines. COMPREHENSIVE PROJECT MANAGEMENT

The Project Scheduler Network will help you meet deadlines and beat cost targets using effective project scheduling. resource planning, costing, and status tracking

Advanced screen graphics. Produce Network diagrams, Gantt charts, and color graphs to provide the condse information you need for timely decision

Work Breakdown Structure (WBS). Organize project activities to produce summary level schedules and reports. Multiple projects can be integrated to present project level schedules and total resource utilization.

Baseline schedules. Save them to compare with current schedules for schedule tracking. Actual, original plan and current plan costs can be graphically compared for cost tracking.

Simplify communications with manage-

ment by synthesizing project information into presentation-quality hardcopy reports and graphs. SCHEDULE WITH THE

CLICK OF A BUTTON

The Project Scheduler Network provides the most advanced software technology available. Start with our mousecontrolled menus to select spreadsheetstyle input templates to enter your

project data.

Graphically build your dependency Network with only a "click of a button. Zoom to view the Network at selectable resolution levels. Now use the mouse to

edit the Network to your satisfaction. Select a Gantt chart and obtain schedules at any WBS level with a single click. Window resource graphs with the sched ule to analyze resource allocations. And finally, select our integrated graphics to view color histograms, bar charts, and line plots of project resources and costs. **FEATURES** 

- Critical Path Method Network Analysis
- Gantt Chart
- Work Breakdown Structure (subtasks)
   Multiple Project Integration
   Tracking with Baseline Schedule and
- Complete Status Resource Scheduling
- Financial Planning and Tracking
   Presentation-quality Graphics
- REQUIREMENTS · IBM® PC, XT, or AT
- PC-DOS 2.0, 2.1, or 3.0 Monitor plus IBM graphics ad-
- · IBM or Epson graphics printer · 320K RAM (minimum)
- Mouse (Microsoft compatible) Two disk drives (one double
- · IBM or HP plotter optional Project Scheduler Network is a trademark of S

(415) 570-7700



fuss or bother—simply tell the program that you are using a Diablo.

Even the manual is good. The DX-ISXL manual is thinner than you might expect, but its 46 pages prove surprisingly useful. The manual covers most, if not all, of the information you are ever likely to need, and it explains everything well enough for a novice user. If you run into problems, support is good also. A call to the factory elicited helpful, friendly, and knowledgeable information.

The printer offers one or two other goodies, too, such as an automatic paper feed and an \$195 optional keyboard so that you can use it as a type-writer.

you can use it as a typewriter.
There's no doubt about it: The DX-ISXL is a honey of a machine. At SU991 it gives you solf delectric-quality output at reasonable speed and price. And while the testing did not include a reliability analysis, much about the DX-ISXL speaks of solid reliability. To be precise, the only thing I could find wrong with this printers its name, only because I find it difficult to

type.

If your printing needs are confined to letter quality correspondence without overwhelming volume or if you already have a heavy-duty dot matrix printer and also want a low-cost, high-quality daisy-wheel printer for putting your best foot forward, this is the one to buy.

-M. David Stone

#### Panasonic KX-P1092

Despite its R2D2-like name, the new Panasonic KX-P1092 printer has a lot of charm and personality; it could be the darling of a small-office or home setup.

The KX-P1092 is a souped-up version of Panasonic's KX-P1091. It's faster and more versatile than its baby brother, and it comes with both tractor and friction feed and a 7K buffer that's expandable to 11K. The printer's well-designed control panel gives you five basic print fonts at the touch of a membrane button. You can select draft, near letter-quality, proportional, italic, or near letter-quality italic print. The front panel also features a form-

KX-Pt092
Panasonic Industrial Co.
One Panasonic Way
Secaucas, NJ 07094

(201) 348-7000 List Price: \$599 Dim.: 5.4" × 16.3" × 13.8" Weight: 19.6 lb. Country: Japan

\_\_\_\_

length dial that makes adjustments for customized forms manageable. With this panel and its full range of programmable features, such as elite, compressed, and double width, the KX-P1092 offers a total

of 74 different print modes. In its standard mode the KX-P1092 emulates the Epson FX-80, including its luxurious escape sequences for reverse paper feed. Like a growing number of new printers, the KX-P1092 also offers IBM printer compatibility through the use of the DIP switches. In its standard DIP switch setting, the printer uses italic characters for its high-order character positions. Switch settings allow the user to enable three different IBM modes. The older IBM Matrix printer is supported, along with the standard IBM Graphics printer and the alternate IBM Graphics printer character set mode. This feature gives the IBM user all the functions of the IBM Graphics and Matrix printers.

The KX-P1092 can't print special characters in the IBM Graphics printer mode in near letter-quality print, but it can reproduce them in a well-formed emphasized and shadowed orint.

When not in IBM mode, you can configure the 7K buffer to allocate memory between buffer space and downloadable front space (as with the Epson 7K series). Furthermore, you can download characters in proportional and near letter-quality print modes. Panasonic even supplies some blank character matrixes to help you create customized characters in all modes. The printer handles IBM graphics

screen dumps and produces creditable, clean, well-composed results. My only

peeves are with the draft quality. The 9-pin wire-formed characters are not especially attractive; they produce a draft quality that screams "cheap dot matrix." At 76 cps in draft mode, the speed is tolerable but does not win any awards. However, the KX-P1092 prints quietly, and this attribute may compensate for its rather nonexem-

may compensate for its rather nonexemplary draft print.

The pressure tractor feed and built-in paper tear bar give you precision paper control, which is essential for any office that uses preprinted forms. It's a shame that the printer does not include a wide car-

riage. The Panasonic manual is very complete and well organized. My calls to the manufacture were greed by well-informed experts providing fine-quality product information. At 599, the printer is a bit product information. At 599, the printer is a bit product information. At 599, the printer is a bit product information. At 599, the printer is a bit product information. At 599, the printer is a bit product information. At 599, the printer is a bit product in the product in the printer is a simple printer in the printer in the

#### Star Micronics SD-15

The Star Micronics SD-15 is a good example of what any printer ought to be: fast, reliable, easy to set up and use, and able to pretty much take care of itself. That doesn't make the SD-15 perfect, but it certainly gives it a head start.

The "15" in the name refers to the 15-

# To err is human; to backup with Irwin, divine.



Let's face it—people make mistakes. And even when people are near-perfect, accidents do happen. Hard disks fail and software bombs. Power fluctuates and files disappear.

There isn't anything you can do to prevent the loss of information...except be prepared for the inevitable. That's why we developed the irwin BACKUP<sup>TM</sup>

Tape Subsystem. It provides a fast, inexpensive way to copy data. So easy you'll use it every day.

Whether you own a PC-XT or the new PC-AT; whether you need to store 10, 20, even 40 megabytes of information, we have the backup for you.

The Irwin BACKUP is the perfect companion to your IBM PG-XT or PC-AT. It's color coordinated to match your PC beautifully. Small enough to fit conveniently on your desk, it comes with a self-contained power supply, and 30 times the storage capacity of a

floppy. The tape cartridges are rugged, built to last. Now there's no more crying over spilled milk (or short circuits). No more swapping flopples. No more costly mistakes. Because now the irwin BACKUP Tape Subsystembacks you up with a heavenly combination: the reliability you need... for only \$995.\*

Irwin Magnetics has installed over 30,000 drives worldwide. We back you up with integrity.

For the dealer nearest you, call 1-800-421-2879
or write:

\*Suggested retail price

Irwin Magnetics 2311 Green Road Ann Arbor, Michigan 48105 313/996-3300



# Introducing the

# The best of both worlds.

For owners of IBM Personal Computers, combining personal productivity and business applications is now less of a leap than ever before. There's a new IBM product that marries the IBM System/36 and the IBM Personal Computer to give you the best of both worlds.

#### Meet the newest member of the System/36 Family. It's called the IBM System/36 PC.

Very small but it opens up new worlds for your personal computer. Very affordable with a price starting at \$5,995, yet capable of running System/36 programs that will help you run your business.

> Even if you've never owned a computer before, this can be your first husiness system, instantly offering the capability of running your business right now and expanding it in the future.

#### Multiuser system.

System/36 PC can be a standalone computer for small companies or a departmental system or even part of a distributed network for larger companies, providing multiuser access to data.

The System/36 PC is made up of a 5364 Processor attached to an IBM PC, PC XT or PC AT. And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

#### Flexibility.

Whether your business has two employees or more than 2,000, the System/36 PC can combine the personal productivity of your PC with the business applications of the System/36 Family.

The System/36 can handle all facets of your business—distribution, sales analysis and general ledger functions.
Accounts payable, inventory control and payroll.

# IBM System/36 PC.

And you can get traditional PC functions such as spreadsheets and word processing.

Software for the System/36 has been developed over the years and has proven invaluable in all kinds of businesses of all sizes. And with the thousands of programs written for both IBM PC and System/36, the sky's the limit for business and planning applications.

The System/36 PC even provides you with data security features so that the right data gets into the right hands.

Small yet powerful. All of this processing power can sit right on a desk or under it either horizontally or vertically. It measures a mere 211/4"x163/4" x61/2"-about the size of a small

suitcase. Yet as small as it is, this little box has multiple processors, with main memory that can be dedicated to running your business functions. In plain English, this means you can get better response time. The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage. depending on your information storage needs.

Easy to use. The System/36 PC is easy to learn and to use. If you need assistance, it has over 2,800 "help" screens that take you step-by-step through any rough spots. You can merge data you've generated on your PC with information that's on your System/36 PC. And you can share information that is stored in the System/36 PC with other attached IBM Personal Computers or System/36 terminals.

Compatibility is high so that you can keep on using many of the PC peripherals and programs you may already own.

Easy growth. What happens when your

small office becomes bigger? That's what the System/36 Family is all about. No matter what size your business, there's a member of the System/36 Family that can help you do whatever

you do, better. As your needs become greater, there's the mid-sized 5362 processor that offers greater performance and can handle up to 22 personal computers or

Then there's the original System/36—the 5360 processor —the largest member of the System/36 Family, which can handle up to 36 personal

System/36 terminals.

computers or System/36 terminals.

Any one of these processors can function as the central processor in your office. Each can communicate with PCs or larger systems, giving communication and connectivity new meaning by allowing departments to share data.

So if your dreams are big but your office is small, the new System/36 PC is the perfect step for you to take. You not only get the best of both worlds, you also get IBM product reliability. And authorized IBM on-site service is available anywhere in the U.S.A.

For a free brochure on the IBM System/36 PC or for information on product availability from participating IBM Product Centers, Authorized PC Dealers or Value Added Dealers, call 1800 IBM-2468, ext. 522, LL, Or call your IBM marketing representative.







#### SD IS

SD-15 Sue Micrones, Inc. 200 Park Ave. New York, NY 10166 (212) 557-6440 List Price: 5599 Dim.: 6.1" × 21.3" × 14.1" Weight: 24.5 lb. Country: Jupan

CIPICLE READER SERVICE NO 671

inch carriage. This is apparently the only thing that distinguishes this printer from the SD-10, which has a 10-inch carriage. Judging by the picture that appears on the manual, this printer in 1 photogenic, but in real life its physical design is clean, crisp, and modern.

We measured the 10-pitch default output at 84.2 cps. This won't win any races, but neither will it leave you drumming your fingers as you wait for printouts. More important, the output is highly read-

able. The printer's near letter-quality mode is good enough to write home with—if not about. With NLQ, the measured speed drops to 28.3 cps. The quality of the default mode, however, is a fready high enough so that you don't gain much in readability with NLQ. But assthetically, the NLQ mode is worth waiting for when you want maximum print quality.

In addition to the NLQ mode, the SD-1sopens a full range of print modes and enhancements, including 10 pitch, 12 pitch, condensed print, expanded print, proportional print, double-strike, underlining, superscripts and subscripts, foreign language characters, and italic. If you can think of it, if s probably here.

This printer is neither the quietest nor the noisiest I've ever used. Call it average. As for noise quality, the pitch is just low enough to avoid the type of whine that drives me out of the norm.

The only problems I ran into on the SD-15 were decidedly minor. This is mostly thanks to a far-better-than-average manual, which is filled with useful illustrations and written in plain English—an unusual language for printer manuals. The halfinch thick manual contains information on everything from how to set up the printer, to how to control it with BASIC, to instructions on creating your own character set. Most users will probably never read all this, but it's nice to know that it's there. The biserest quibble I have with the manual

The manual does have, however, at least one piece of misinformation. Like most printers, the SD-15 has DIP switches for setting options. The manual specifically states that these are located in the compartment with the printhead. It even has an illustration showing them there. Unfortunately, in this case art doesn't imitate

is that it has no index.

life—the switches are actually on the outside of the machine, on the back panel. Once you find the DIP switches, everything works swimmingly. The SD-15 has a Star mode and an IBM mode, each of which has its own character set and its own command set. Odds are you'll want to use the IBM mode, in which the SD-15 bethe IBM mode, in which the SD-15 be-

haves for all the world like the IBM Graphics Printer.

At \$599, the SD-15 may not be a spectacular bargain, but it is a sturdy, workmanlike machine that does its job well. —M. David Stone

#### Panasonic KX-P3151

Pansonic's new KX-P3151 wide-carriage daisywheel printer came out of the box ready to plug in and raring to go right to work. That sort of packaging always puts me in a good mood because new printers can sometimes be as omery as a junkyard dog. But the new Panasonic was as friendly as a newbom pup.

But, like man's best friend, all printers are not created equal. The print quality of the KX-P315 was good to excellent, even compared with some of the more expensive fully formed character machines. The characters were crisp, and the underlines were smooth and unbroken.

The rigid mounting and tight tracking of the printeds could account for this quality. Upon unpacking, I found a steel bracket held in place by two screws to keep the head stable during shaping. Even after removing the assembly, however, the head wouldn't budge. And even though the KX-#3151's excellent documentation revealed no other printheed packing. I must have used the foliality and the printed packing. I make the printed packing are proposed to the printed packing and the printhed summed to attend to—impressive unusual transport and temporal members are printhed summed to attend to—impressive the printhed timed to the printhed timed timed to the printhed timed timed



#### KX-P3151 Panasonic Industrial Co. One Panasonic Way Sectatorus, NJ 07094 (201) 348-7000 List Price: 5659 Dim.; 7 5' x 22.1" x 15"

Weight: 28.7 lb. Country: Japan

CIRCLE READER SERVICE NO 670

#### New Generation Communications

Our new Crosstalk Mark 4 behaves just as reliably as the Crosstalk you've always trusted. But when you ask it for a bit extra, you're in for some surprises.

#### **Up To 15** Concurrent Sessions

Mark 4 supports the X.PC multiple session protocol, so it's capable of up to 15 concurrent communications sessions, each with the end-to-end error-checking needed for tomorrow's higher speed modems.

With more than one session going on at once, you need some way to keep track of them all. Crosstalk Mark 4 has that, too.

#### What You Get Is What You See

Mark 4 Identifies each session with a "page" number. You can flick from one session to another with one keystroke. See each one full screen.

But if you'd like to keep an eye on more than one session at once, you can create windows - as many as you need in any size or shape - to display them all.

#### Menu? Or Command?

No matter how expert you are, Mark 4 is just your speed. It operates on command, or with a menu, or any combination of the two.

If you need help at any point in your command sequence, Mark 4 gives you suggestions that apply precisely to the task at hand.



#### Why Repeat Vourself?

If you make the same calls often. as most people do, Mark 4 can save you a lot of dull repetition. It has built-in command programs to call up and log in to most of the major information utilities.

But Mark 4 goes one step further. It can "memorize" any command sequence you perform, then repeat it that way any time you ask it to. You can't make programming much easier than that.

#### And Now, By Popular Reauest ...

 Mark 4 has a text-editor built in. You can create and edit files without having to leave Crosstalk.

 Mark 4 emulates the most popular terminals, including IBM 3101, DEC VT-52, VT-100, and the TeleVideo 900 series. Most other programs

emulate one or two. In addition to X.PC Crosstalk Mark 4 supports Kermit, Xmodem, and

of course our own Crosstalk protocol.

CIRCLE 326 ON READER SERVICE CARD

#### How New Is New Generation Communication?

New enough for the advanced breed of modern that's already coming around the comer. New enough to give you the best highspeed, error-checked communication possible on noisy phone lines - or secure dedicated lines.

Finally, because Crosstalk is already the industry standard for small business computers. Mark 4 is at home in a broader universe than any other communications software.

#### Our Choice Is Your Choice

Naturally, we still offer our bestselling Crosstalk XVI program, for almost all business microcomputers. It has all the communications features that many users will ever need.

If you need more, Mark 4 obviously has more. We'll even upgrade your copy of

Crosstalk XVI to Crosstalk Mark 4, for a moderate charge. It's your choice. Mark 4 may be new

and improved and NLK revolutionary -

but it's still Crosstalk



In fact, impressive is the word I would use to describe the way Panasonic has built the KX-P3151 in general. Of course, no one has designed a test (short of running a printer to destruction) to find out just how durable a printer really is, but I feel a lot more confident about a machine that starts its working life this way than one that comes out of the box all loose and floppy.

Panasonic's engineers haven't overlooked the human element either. They've provided a place to hang the regular paper support when you're using the optional sheet-feed or tractor assemblies-not the most important feature I've ever seen, but it demonstrates a "spare nothing" attitude toward the user. And any switches that have to be accessed during normal operations are well labeled and easily found right up front under the cover.

The KX-P3151 has all of the programmable enhancements and features I look for on a daisywheel printer. Plus, Panasonic added one "extra" that I liked: two kinds of underlining. The KX-P3151 does continuous underlining like most machines, and it also underlines word by word, leaving blank spaces in between.

Speed is not this Panasonic's greatest attribute, but at better than 22 cps in our test, it's more than competitive with other fully formed printers in its price range. It also comes with a measured noise level several dBAs below many comparable machines, and it wouldn't disturb the quiet of an executive suite. Its styling is quiet and almost understated-another attraction for a corporate user.

I was surprised when I found out that the KX-P3151 costs only \$659. 1 would have expected a higher ticket, and at that figure this printer should be a winner. -Jim Forney

#### Epson FX-185

Epson has pulled out all the stops with its new wide-carriage FX-185 printer. The FX-185 is wide and fast, offers true IBM compatibility, near letter quality, and an 8K print buffer; it also makes selecting a variety of print features a snap. It's a prac-



#### FACT FILE

FX-185 Epson America, Inc 2780 Lomita Blvd. Torrance, CA 90505 (213) 539-9140 List Price: \$699 Dim.: 5.9" × 24.3" × 13.9 Weight: 23.8 lb. Country: Japan

CIRCLE READER SERVICE NO 669

tically perfect printer for anyone who needs a versatile, low-cost printer that's also dependable.

The FX-185 was designed to replace the FX-100+ printer (a redesigned FX-100, already new this year). Combining the versatility and speed of its predecessor with the ability to print PC graphics, the

When you toggle a single DIP switch, the new FX-185 becomes

two printers in one, offering both IBM and

Epson standard modes.

new FX-185 is especially attractive to anyone who uses enhanced print features. Gone are the days when Epson chose not to support the IBM extended character set. When you toggle a single DIP switch, the new FX-185 becomes two printers in one, offering both IBM and Epson stan-

dard modes.

The Epson FX-185 lets you select a very presentable near letter-quality (NLQ) text through a button on the front-control

panel. Each of the buttons on the front panel serves a double function. When the PC is on-line, the line-feed and form-feed buttons work in the usual manner. When your PC is off-line, the same buttons select draft or near letter quality.

Besides single-button selection of NLO print, the Epson FX-185 can use Selec-Type to produce special print features. In

the SelecType mode, pressing different combinations of the off-line, form-feed, and line-feed buttons gives you nine different print features that include expanded. subscript and superscript, underline, double-strike, and italic, among others. These features can also be combined to make a series of commands. In effect, you can use SelecType to control the printing of an entire document. You will never again need to learn a single escape sequence-unless, of course, you want to select a feature for an individual word or line.

When your text requires a special print feature in a portion of the document, you can use the FX-185's Master Select feature. Master Select allows you to choose and combine seven different modes of text with a single, powerful, "macrolike" escape sequence.

In IBM mode you can enable escape sequences to control pitch and print enhancements as well as graphics. Not all of the Enson standard command features are accessible in IBM mode. For example, you can achieve NLO print in IBM mode from the front-control panel, but not through an escape command. Similarly, there are no IBM sequences to enable Master Select. proportional modes, and the plotter-type graphics modes, to mention just a few.

The Epson FX-185 has the traditional Epson built-in tractor feed, one of the nicest designs on the market. You can use the tractor for continuous-feed paper and the friction platen to accommodate anything clse.

### "THE DAY I STOLE THE ACCOUNTANT'S COMPUTER"

by Suzanne Falter, copywriter



rewriting, and rewriting. One day, I'd finally had it. So I walked over to the accountant's desk, and stole his com-



computer asked if I wanted to talk words or numbers. I opted for words. Then it offered me the choice of English, French, Spanish, or maybe Italian.



I chose English to save time. This program seemed to under-"More paragraph" I'd say, and it would. We were talking like two adults, in nouns and verbs. And so, I wrote.



I edited. I deleted. I even switched paragraphs around. Then I hit the wrong button. Suddenly, the accountant's projected budget for '86 filled the screen with pie charts. Clearly, this was not just some little word processing program.



Within fifteen minutes I had learned all the basics. And I knew I was through with typewriters forever. Tomorrow, the program is going to teach me how to do mailing lists. And next week we'll get into spreadsheets. But first, I have to get rid of the accountant.

WORD RESULT handles all word processing functions. CALC RESULT handles all math functions. Both programs can be used simultaneously. Software usable on IBM PC and compatible or Victor computers. Word Result, Calc Result, \$295 each; \$495 when purchased together.

Please send me a sample program of Word Result and Calc Result. Enclosed is \$5.00. (Money back guarantee.)

Handic Software, Inc., 400 Paterson Plank Rd., Carlstadt, N.J. 07072. (201) 933-1455 or (800) 524-0484. New Jersey residents add 6% sales tax. Please allow three weeks for delivery.

A World Lender in Software

Word Result\*/Calc Result\*
by handic software, Inc.

The FX-185 is the kind of printer you can easily use with almost any software in a matter of minutes, since the Epson FX series is a standard printer option in almost any applications program. And, if you study the FX-185's detailed manual, you can achieve maximum print versatility and customization. Though such virtuosity may be difficult to master, the FX-185 is a printer you can grow with.

Because the model reviewed here was a prototype, it was not accompanied by documentation. Kudos to Epson on shipping a printer that is so straightforward you can get up to speed without documentation. Despite the lack of guidance, I had no problem with the FX-185's operation.

As the competition for the best low-cost printer escalates, the FX-185 is well-positioned. Flexible, versatile, easily programmable, and capable of an attractive NLO print, it should be a big seller. -Robin Raskin

#### Okidata Microline 193 (Standard)

As an enthusiastic owner of an Okidata printer with a lot of miles on it. I was looking forward to testing a new Microline. I unpacked the Okidata Microline 193-Standard version eagerly, but my anticipation was soon turned to disappointment. I was not happy with the printer or with its accessories

Thin may be in, but what may be desirable at the health club doesn't necessarily work when building a printer. In the Microline 193's case, thin also means a lack of structural strength. It doesn't take much effort to grab this printer by the ends and twist it back and forth. While normally you wouldn't do that while printing out a document, a printer ought to be solid enough to resist that kind of treatment.

Setting up the machine was easy enough, but unlike the mechanism on my old Microline, the tractor assembly was cheap, flimsy, and ill-fitting. The tractor worked but I'd bate to bet on for how long. And the tractor interfered with the right-hand paper bail bracket, which had to be shoehomed in around it. The "access cover" fell off every time I had to open it. After it fell on the floor several times. I just left it there.

The "acoustic cover" also fit poorly. I had to believe it was borrowed from some other machine and just thrown in for ef-

Setting up the new

Microline 193.

Standard version, was

easy, but the tractor assembly was flimsy

and ill fitting.

fect. However, without the cover the machine made more noise than I could accept.

At least the documentation for the new Microline has been improved in some respects. But unlike the documentation for their older printers, Okidata has abandoned the loose-leaf format for a spiral binding. Personally, I liked the loose-leaf arrangement better because I could insert notes anyplace I wanted or easily update, as when I modified my Okidata 92 for Plug

'n Play. At first I was pleased to see that Okidata had gotten away from the use of spooled ribbons in their new Microline series and gone to cartridge ribbons instead. Changing ribbons on the old machines is a nuisance and probably my biggest gripe. But the flimsy cartridge Okidata has adopted makes me question whether this change is really for the better.

The printhead on the new Okidata Microline 193 was also thin, and the mounting was sloppy on the one I tested. That could account for print quality I found to he slightly inferior compared to output

from my own machine. In addition, unlike the earlier Microlines, which you could retrofit with a Plug 'n Play kit to provide full IBM compatibility, the new ones require that capability in order to be factory installed. That could limit your options if you want to use the Microline 193 with more than one type of computer.

I'm still glad I own an Oki, but even though my fingers are smudged from threading new ribbon spools into it. I'm glad its not a Microline 193. -Jim Forney

#### Okidata Microline 193 (TBM)

PC Magazine's testing lab started looking like a Noah's Ark as Microline 182s, 192s, and 193s from Okidata arrived two by two. Each pair is differentiated only by the absence or presence of a tiny sticker that says "IBM PC Graphics Compatible." The sticker is so small that you and your dealer will no doubt be just as confused as we were at first.

The IBM-compatible version of the Mi-



Okylete 532 Fellowship Rd. Mt. Laurel, NJ 08054

(800) OKIDATA (609) 235 2600 (in NJ) List Price: \$699 Dim.: 3.2" × 14.2" × 10.8" Weight: 13.2 lb.

Country: Japan

CIRCLE READER SERVICE NO 668



Microline 193 (IBM) Okidata 332 Estilowashin Rd

Okidata 532 Fellowship Rd. Mc. Laurel, NJ 080054 (800) OKIDATA (609) 235-2600 (in NJ) List Price: 5699 Dim.: 3.2" × 14.2" × 10.8" Weighi: 13.2 lb. Country: Japan

CIRCLE READER SERVICE NO 66

croline 193 is the smallest wide-carriage compatible dot matrix printer we've seen. It supports the IBM character set and all the IBM graphics printer control sequences, as well as graphics.

It also has a number of added features, including elite type, italic, correspondence quality, and downloadable fonts. The printer even comes with a disk containing five font files, a program to load them into the Okidata Microline 193, a program to make your own fonts, and a 13-page printity-yourself manual.

It's ourself manual. It's user like a machine that could print 240 compressed characters across, provided the properties of characters across, provided the properties of the

The default text print quality looks good and prints at a zippy 66 eps. The correspondence quality is attractive at a respectable 35 cps. However, the enhanced print mode (equivalent to IBM's double-strike mode) looked excessively fuzzy, as if some alignment were off. The Microline 193 can also do a graphics screen dump with the DOS GRAPHICS program loaded, but it waits as if in dire pain.

The printer manual is a good learning tool for a novice printer user. Each type of print feature is discussed and illustrated with a BASIC program that sends out the appropriate escape sequences. Often, the manual shows the resultant dot patterns. The book almost seems like a reincarnation of the old Epson FX-80 manual.

Some printer features can also be invoked by using a menu system from the front panel. However, like most printer menus, without a number pad you have to remember which buttons perform which

functions.

The downloadable font disk turned out to be a bummer. The Gothic and Roman fonts aren't very interesting, and you can barely notice the difference from the regular resident front. There's only so much consecutive horizontal dots are unavailing a SXI 1-dot pattern when consecutive horizontal dots are unavailing the consecutive horizontal dots are unavailing the consecutive horizontal dots are unavailing the consecutive horizontal dots are unavailing that the consecutive horizontal dots are the consecutive horizontal dots are unavailing that the consecutive horizontal dots are unavailing to the consecutive horizontal dots are unavailing to the consecutive horizontal dots are unavailing to the consecutive horizontal dots are unavailing that the consecutive horizontal dots are unavailing to the co

Since I'm accustomed to older Okidata Microline printers, these tiny new Microlines really disappointed me. Okidata's Microline line of small wonders has been shrunk to a line of small blunders. —Charles Petzold

#### IBM Color Jetprinter

Any printer from Big Blue has to be taken seriously for its marketing potential. For this reason alone, the IBM Color Jetprinter is worth your attention.

Physically, the Jesprinter has the kind of quiet good looks that I associate with a fine European road car; it also has the same kind of solid feel to it. Work with this printer, and you get the same sense of rugged dependability that most people look for when they close car doors and listen for that certain thwack.

Unquestionably the best feature about this printer is its low noise level. If the least objectionable dot matrix printers have the sound quality of a loud whisper, then the Color Jetprinter makes the noise of a falling feather. You could seriously put this printer in your bedroom and let it do its printing while you sleep.

The problem is that if you do a lot printing, you may just have to let the printer run overnight. It's simply that slow. IBM claims a peak of 50 cps in draft mode with compressed characters. We measured 18.8 cps in draft mode with normal-size characters and 13.5 cps in text mode.

Also worth noting is that the printer consistently gives a timeout error during paper feed. In other words, the printer is so slow that the PC gives up on it. This can be



fixed by telling the computer to make an infinite number of retries (the command is MODE LPT1:..p), but IBM doesn't bother telling you about this in the printer's manual.

Except for this oversight, however, the documentation is reasonably well done. The Guide to Operations is standard IBM issue-clearly written and filled with line drawings that show you how to load paper or install ink cartridges. The list of control codes may not explain the commands in enough detail for a novice, but at least the information is there

Unfortunately, the text quality of the Jetorinter qualifies as more bad news. On the standard paper PC Magazine uses for printer tests, both the default quality and text quality were fuzzy at best.

The fuzziness, like the low noise level, is typical for ink-jet printers. The ink is absorbed by the paper before drving, so there's a little bleeding. This problem can be eliminated if you use specially coated paper (supplied by IBM at about 6 cents a sheet), but even then, the quality leaves much to be desired. If you use the default print quality, you get to play connect-thedots. Text quality is better, but IBM chose to call it text quality because it's just not good enough to be called letter quality.

Color graphics on the Jetprinter fare much better than text. With standard paper, the color ink also bleeds, but on the specially treated paper, the graphics are sharp and the colors are vibrant. A special bold switch lets you print transparencies as well

The Jetprinter has a problem with color printing if the background on a graphic is a composite color (one that is produced by combining two color inks). With composite colors, the background may bleed into any text in that graphic. The problem gets worse if the text itself is also using a composite color. Under these conditions, sharp and vibrant can turn into dull and muddy.

Overall, the output on IBM's Color Jetprinter is potentially gorgeous, but the quality is no better than on other printers in the same price range. At \$745, the Jetprinter is fairly priced, but it's nothing special. If you're getting only one printer for both text and color graphics, this is definitely not the one to get. If you're getting a



separate color printer, though, this one probably belongs on your list of possibilities .- M. David Stone

#### SCM Smith-Corona D-300

Much to its merit, you can uncrate, assemble, and run the Smith-Corona D-300 dot matrix printer without reaching for your analyst's phone number. The simplicity of this \$745 printer is the secret.

Although its price won't merit a second glance from the bargain hunter, the D-300 has a substantial build and a number of features that make it a very acceptable smallbusiness printer.

The printer's tractor feeder, DIP switches, and self-test worked effortlessly and fairly quickly. Only the ribbon threw me for a loop when I was forced to translate the German installation instructions.

The D-300 comes equipped for both RS-232 and parallel ports, a 2K buffer, and an IBM-compatible switch setting. Also, toll-free telephone support really answers your questions. The printer can handle as many as three

copies at once, and its 15-inch carriage is useful for many office needs. The printer also employs both tractor and friction feed to accommodate fanfold or single-sheet paper. And it supports enhanced print features like proportional printing, italic, suband superscripts, and underlining.

In draft mode the D-300 clocked in at

92 cps, which places it among the quicker half of comparably priced dot matrix printers. In near letter-quality (NLQ) mode the speed was reduced to 25 cps, but the print was easily 4 times better than the quality of the draft print mode. Careful scrutiny revealed jagged edges on the NLO characters, but I'd have no qualms about passing the output of this printer around the office.

The DIP switches on the back of the D-300 control eight international-character sets and enable other features, including a hex code dump of your printed output. The D-300 also allows you to download customized character sets using its standard 8 × 11 matrix.

If the D-300 is set for IBM mode, it is fully compatible with the IBM PC extended character set and the IBM Graphics Printer command sequences. However, the printer was foiled when I entered the escape command to print NLQ output while the IBM character set was enabled. Instead of printing English, the D-300 printed bizarre graphics characters that looked like ancient Egyptian hieroglyphics. After calling SCM's technical support. I followed their advice and tried to print the IBM character set using BASIC commands and hex dumps, but my printout still had more hieroglyphics than King Tut's tomb. I was at long last released from the land of Pharaoh when SCM advised me to turn the IBM DIP switch off. The result was a fine-looking NLO print with no IBM graphics compatibility.

I encountered a similar problem when I tried to use a command sequence to change from NLO to draft quality mode. The process caused my text to appear in elite (12

# Compare the Hercules Color Card to IBM's.

Five reasons why the Hercules Color Card is better.





IBM Color Adapter \$244

 Compatibility Runs hundreds of graphics

programs.

Hercules Color Card \$245

Runs the same hundreds of graphics programs. "The Hercules Color Card is so nearly identical to the IBM Color/ Graphics Card that it's almost uncanny." PC Mag.

None. 2. Printer port.

Standard. Our parallel port allows you to hook up to any IBM compatible printer.

3. Size. 13.25 inches. Limited to long slots.

5.25 inches. Fits in a long or short slot in a PC, XT, AT or Portable.

4. Flexibility. Can't always work with a Hercules Graphics Card.

Always works with a Hercules Graphics Card by means of a software switch

Warranty. 90 days. Two years.

Any one of these five features is enough reason to buy a Hercules Color Card. But perhaps the most convincing reason of all is just how easy the Hercules Color Card is to use: "Right out of the box, the Hercules Color Card goes into an empty expansion slot. ready for you to plug in . . . and go to work-no jumpers, no software. For most applications, it's just that easy." PC Magazine.

Call 1-800-532-0600 Ext. 420 for the name of the Hercules dealer nearest you and we'll rush you our free info kit.

We're strong on graphics.

cpi) mode instead of the normal pica (10 ppi) mode. While the manual's discussion of NLQ print lists two ways to exit the NLQ mode, it doesn't say which one of the methods will get you back to standard characters. Again, the documentation should have spared me the agony of trying to play Sherlock Holmes.

Aside from the mysteries of the modes, the D-300 passed my test with high grades in all areas. The only real exception was the durability of the manual. It fell apart after only one afternoon spent flipping through the pages.

SCM faces fierce price competition from traditional dot matrix printer manu-

from traditional dot matrix printer manufacturers like Star, Okidata, and Epson. All have just introduced a line of low-cost, wide-carriage, high-quality dot matrix printers. The D-300 is reliable and quick and produces a high-quality print, but for it to compete successfully, SCM will need to reduce its price.—Nancy Trespasz

#### Xerox/Diablo Advantage D25

Just when we thought dot matrix printers had come to dominate the market, low-cost daisywheel printers are getting more popular. While the dot matrix letter or memo has become an accepted part of our culture, sometimes dot matrix output just won't do, even if it's made by 24 tiny pins.

An example of the daisywheel resus, a green is the Disho Advantage Disho Disho Si gendany 630, mighements the same control sequences (well supported by word processors), and suffers only a 4d Porcent reduction in speed. If you always wanted a Diabho disho yellow place of the Disho Si which place Disho Disho Si was be just the Diabho you've been waiting for.

Besides the Diablo name, however, does the Advantage D25 give you your money's worth? It has been released at a time when several manufacturers have new, low-cost daisywheel printers on the market. After looking at these other print-



ers, you may have second thoughts about buying the Advantage D25.

The print speed of the D25, about 22 g, si acceptable for an inexpensive daisywheel printer. The print quality, though, is not as clean as it should be, often revealing small gaps and holes in the characters. The unevenness did not show up consistently in the same letters, so it didn't seem to be the printwheel's fault. The boldface mode looked better, but even the much-denser shadow nrint was a little forey.

The Advantage D25's continuous underlining is sluggish. It prints all the characters on the line and then goes back to underline them at a much slower rate of speed. In fact, using continuous underlining for an entire document slows down the print speed to 5 cps.

On the plus side, the Advantage D25 has an attractive black and off-white box, with green, red, and blue control buttons. Although a bidirectional tractor and a single-sheet feeder are available as options for the D25, we did not have the opportunit to test them and simply fed fanfold paper through the friction feed. This process is certain to result in paper drift after a while, but the drift was surprisingly slight, indicating some good construction.

The DIP switches are located on the front panel behind a flip-up door, they're well labeled and conveniently in the off position for running the printer from the parallel port on an IBM PC. Instead of an on-line/off-line toggle button like that normally found on front panels, a start button turns the printer on-line and a separate stop button turns is off-line.

The Advantage D25 has the Diablo All fa

Purpose Interface (API), which can accept Centronics, IEEE-488, or RS-232C signals through the same 50-pin connector. Be sure you get the right Diablo-made cable for your machine—don't leave the

store without it.

Don't immediately jump for the Diablo name, though. Take a look at the other daisywheels in its price range. The Advantage D25 is certainly a contender in the field but not necessarily the winner.

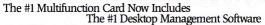
-Charles Petzold

#### Star Micronics Star SR-10

The Star SB-10 is a brand-new design from Star Micronics, and it looks as if the company has done it right this time. For a dot matrix machine, the SB-10's print quality is awesome, thanks to a 24-pin printhead. And the machine is packed with print enhancements and other features, all of which are well documented for the beginner or the experienced user.

A closer look reveals that the printing is not quite up to me letter quality in its high-quality mode. But those 24 little pins come about as close to matching fully formed character performance as anything I've seen. In fact, a small business starting out with limited funds could probably get up and running using a single printer like this without having its printouts give away the fact that it's on a tight budget.





The Best Multifunction Card Just Got Better. We've enhanced our SixPakPlus multifunction card with a new extra feature: Borland's SideKick desktop management software. Now you can get the best the industry has to offer together in one package – in 1984 SixPakPlus was voted the #1 multifunction card in PC World's World Class User Survey and chosen as Softsel's Best Selling New Product, while SideKick was selected as InfoWorld's Software Product of

The Best In Performance. Over 400,000 satisfied customers will tell you SixPakPlus provides the power for today's demanding requirements, whether you use an IBM® PC, XT, 3270 PC or compatible.

First there's more memory - an additional 64 to 384K RAM-to process more data, or to run today's software programs such as the SideKick multipurpose software we've included. Our extra memory and SideKick's features also work beautifully with your other favor-ite software packages like Lotus 1-2-374 WordStar,\* Symphony™ and dBASE III.™

Next, more Input/Output ports - one serial, one parallel and an optional game adapter - to add peripherals such as printers, modems, a mouse, plotters or joysticks. Then there's our built-in clock-calendar for automatic time and

And we've included another of our "World Class" award winners, SuperPak utility software. Selected top in its class for two consecutive years, SuperPak features SuperDrive™ which works like a drive but fifty times faster, and Super-Spool™which lets you print and input at the same time.

The Best in Quality. If the industry's lowest rate of return is a good indicator, then SixPakPlus can't miss when it comes to quality. And we back this dedication to quality with a dedication to service and support. The AST commit-ment even extends to documentation, with our comprehensive user information you'll find SixPakPlus is also the easiest to install and operate.

It takes an industry standard to advance the standard. When you want the best, look to AST's SixPakPluswith the added value of SideKick software. For more information call our Customer Information Center (714) 863-1333. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 TWX: 753699

CIRCLE 102 ON READER SERVICE CARD

- Includes SideKick Desktop Management
- Memory Expansion to 384Kb, allowing
- total PC memory expansion to 640Kb · Serial port for connecting to a printer mouse, modem or other asynchronous
  - . Parallel port for use with parallel printer,

  - · Optional game adapter port-plug in jousticks and other cursor-control devices
  - \* Battery backed Clock/Calendar for matic time and date stamping
  - · AST's SuperPak includes SuperDrive electronic disk and SuperSpool print spooler





Star SB-10 Star Micronics Inc. 200 Park Ave. New York, NY 10166 (212) 557-6440 List Price: \$749

Dim.: 5.8" × 16.5" × 14.5" Weight: 24.3 lb. Country: Japan

\_\_\_\_

At a measured 33.9 cps in its near letterquality mode, the SB-10 beats fully formed character machines costing much more. And with a data quality throughput at a measured 73.5 cps, it could easily serve as a shared resource for a multiuser network, providing either extra speed or a very good imitation of letter quality on de-

I was impressed by the ease with which the SB-10 went on line. It was up and running within 10 minutes of my taking it out of the box. Credit a good part of that to its setup and operation being simple and obvious and also to self-explanatory touch-but no controls on a front pane. But a lot of credit also has to go to one of the best, most complete or time rannuals I've seen.

The musual even has a special chapter on how to use the Sb-10 to best adverse with three of the most popular spreadthers with three of the most popular spreadther peakages—bellpful information your favorite spreadtheet documentation may not contain. It also has a chapter on work contain. It also has a chapter on work contain. It also has a chapter on work accessing the various print features. Clearly someone at the policy-making level has decided not just to low you at the each register and then leave you on your own once you go home.

You feed paper through the back to an easily adjustable built-in prinwheel assembly that pulls the paper in and pushes it past the roller and platen. However, the SB-10 can just as easily operate as a friction feed printer to handle single sheets.

As for physical appearance, Star Micronics has deviated from the basic box to make an attractively packaged printer. Except for the on/off switch, the operating controls are neatly grouped into a compact front panel of membrane-type switches and status indicator lights.

I was really impressed by the beautiful text printing the Star SB-10 did. It really is awesome. It would be nice if it could do IBM compatible graphics as well, but you can't have everything. If you're looking for a top-notch text printer that runs at dot matrix speed, you've got to try out the Star SB-10.—Jim Forney

#### Datasouth Personal Printer II

Quiet operation, a comfortable dot matrix print speed, and a wide carriage with builtin tractor for forms up to 17 inches wide are the key features offered by Datasouth's new Personal Printer II.

Datasouth's documentation for the Personal Printer II is well written and clearly

illustrated. Better yet, the instructions for mounting the ribbon are under the printer cover, where you can easily find them when you need them most. And you'll probably refer to them often because ribbon cartridge installation on the Personal Printer II is a little unusual.

Instead of mounting the ribbon carridge on the printhead carriage, you must affix it to the right side of the printer. Next, you have to pull a loop of ribbon down to the leftend of the printer—over a couple of idler posts—then thread the one end through the printhead. Since the main advantage to using a carridge is the convenience of not having to thread the ribbon,

all this maneuvering defeats the purpose. Paper is fed from the rear via a pusher pinwheel assembly for fanfold forms or friction for single sheets. The pinwheels can be adjusted to handle forms up to 17 inches wide. Paper loading was easy, even though the tightly designed acoustical cover leaves little extra room for paper to slip

through.

Emulating the Epson protocols, the Datasouth Personal Printer II is IBM graphics compatible and generally does a good printing a graphics screen. However, a thin white space was evident between passes, indicating a slight mismatch in the vertical paper feed per pass, although for most arolleations this is not simifacent.

Print quality samples run on the Personal Printer II, even in its near letter-quality (NLQ) mode, however, were not impressive. The dot pattern appeared a little lumpy even to the naked eye.

Considering the price, I was also disappointed by the limited range of print op-



Personal Printer II
Datasouth Computer Corp.

Datasouth Computer Corp.
4216 Stuart Andrew Blvd.
Charlone, NC 28210
(800) 222-4528
(704) 523-8500 (in NC)
List Price: 5795
Dim.; 5,1" × 23.5" × 13.8"
Weight: 26.4 lb.
Country: Japan

CIRCLE READER SERVICE NO 662

# Alloy takes your PC to the limit.

QICSTOR-PLUS. The ultimate in PC expansion with five IBM compatible slots, hard disk storage, and streaming tape backup in one neat package.

Alloy's QICSTOR-PLUS meets all your expansion needs. It's the ideal upgrade for a growing PC or AT system.

QICSTOR-PLUS has five full size expansion slots which are completely compatible with the IBM PC bus and they also support Alloy's PC-SLAVE-/16 multi-processor, multi-user capability. Its high performance hard disk has a capac-

ity of 36 to 128 MBytes. And QICSTOR-PLUS has file-oriented streaming tape backup with a formatted capacity of over 50 MBytes. Alloy provides fileoriented QTIP software with a transfer rate of 2 MBytes/minute.

QICSTOR-PLUS is available right now. So call Alloy today at (617) 875-6100.



ALLOY QICSTOR-PLUS



Alloy Computer Products Inc., 100 Pennsylvania Avenue, Framingham, Massachusetts 01701. Tel: (617) 875-6100, TWX: 710-346-0394 In Europe: Alloy Computer Products (Europe), Ltd., Cirencetter, (Boscaterahire, England, Tel: 0285-68709, Tix: 45340 CIKCL 2010 ON READERS SERVICE CARD.

tions that the Datasouth Personal Printer II offers. Except for underlining, expanded (double size), and proportional spacing, none of the popular print enhancements like bold or emphasized are available, except in the data quality mode. Some sort of emphasized printing can be very handy when handling data—for instance, to call attention to certain items on a spread-sheet—so I'd like to see more enchancements available in the NLO mode.

Largely because of good acoustical design, Personal Printer II is a quiet machine, measuring several decibels lower than most machines in its class and price range I've seen lately. I could live very happily in the relative quiet of the Personal Printer II environment.

It devices that it is a baseouth product appears to be quite substantial. But on the whole, I can't give Datasouth is now Perwison to the product of the product of the house enough. Teatures or a high enough print quality or make to of real interest in today's highly competitive market—especially if you comparison shop and see what \$759 will buy in a new printer.

—Jim Forney.

#### Star Micronics SR-15

Star Micronics seems to have invented a printer construction set from which to build a series of quality printers that vary only in detail. The SR-15 dot matrix printer is one of these.

is one of these.
The SR-15 is a close relative of the SR-

#### The SR-15 is not all

that different from

other Star printers in

only the details vary.

10. The only important difference is that the SR-15 has a 15-inch carriage, and the SR-10 has a 10-inch carriage. Nor is the SR-15 all that different from other Star Micronics printers, notably the SD-10 and SD-15, in terms of features—again, only the details value.

This is another printer that looks better in person than it does in pictures. The photo on the manual makes the SR-15 seem clunky, but it actually has a suitably modern design.

em design. Like other Star printers, the SR-15 has both a Star mode and an IBM mode. Each mode has it to on-theracter set and lost the SR-15 does a good imitation of the IBM Graphics Printer, complete with garbic capability and all the usual print enhancements—such as 10 pinch, 12 pitch, condensed print, expanded print, doubt-strike, underlinting—as well as proportional spacing, foreign language characters, and taile.

Default quality printing comes in at a respectable 101.6 cps. The speed plunges to just 29.0 cps in the near letter-quality mode. The default quality is highly readable, which means you'll want to use it under most conditions. The NLQ mode looks better, of course, but given the difference in speed, you'll probably need it only when the best print quality is absolutely essential.

The noise level of the SR-15 is typical of dot matrix printers. I've heard noisier ones, and this one is certainly tolerable. The noise quality is average, too.

Like other Star printers, the SR-15 comes with a compact manual filled with useful illustrations and written in clear English. You will find plenty of detailed information, including how to set up the printer, how to control it with BASIC, and instructions on creating your own character set. My major quibble is that the manual lacks an information.

Be forewarned about one bothersome feature on the SR-15: Every time you lift the cover, the printer goes into its pause switch mode, and you have to hit the pause switch before you can print. The cover sensor that triggers the pause is standard, of course, and it's usually easy to defeat it if you find it annoying. On the SR-15, however, the switch is magnetically controlled and can't be disabled.

The SR-15, like the other new Star printers, is a creditable machine. At \$799 you won't find it in the bargain basement; however, if you can afford it, you'll most certainly get your money's worth.

-M. David Stone

#### Citizen MSP-25

"Where's the printer?" was my first question on opening the box to the Citizen MSP-25. The MSP-25, a new lightweight, low-profile dot matrix printer with a 15inch carriage, is not just thin—it's anorexte-looking. All I saw in the carton was this skinny thing hoding two blocks of styrofoam apart and a lot of empty space that turned out to be the printer.

In the case of the MSP-25, we have a printer that is structurally so flimsy that when I put a ruler under the front corner of



Star SR-15 Star Micronics, Inc. 200 Park Ave. New York, NY 10166 (212) 557-6440 List Price: \$799 Dim. 4.6" × 21.9" × 13.6" Weight: 24.5 lb. Country: Japan

CIRCLE READER SERVICE NO. 661



the machine. I had to lift more than 5/16 of an inch before another corner came off of the desk. No precision printer mechanism can tolerate that much flexing and be expected to maintain any kind of accuracy for very long.

And that wasn't all that was flimsy. The back half of the cover and the sheet separator both had slots they were just dropped into, with no more than the capricious whims of gravity to keep them there. The result was that both fell off repeatedly. I quickly caught on that it wasn't worth the bother trying to keep them on the machine.

Part of this easy removability is by design. The documentation tells you to remove the paper separator to load fanfold paper, and that necessitates removing the top cover, which sits over it. They also tell you to remove the front cover (paper cutter) when loading fanfold paper, but I didn't find that necessary. I don't like working with a noisy printer, but I think in the case of the MSP-25, it's better to leave the top cover off permanently and just put up with the extra noise.

Otherwise, paper feed was straightforward with an adjustable pusher pinwheel assembly tucked down into the skinny case to run the paper past the roller-or you can use friction feed for single sheets. However, even with the pinwheel I found the construction to be strictly light duty, and the pinwheel position locks somewhat sloppy.

The MSP-25 uses a rather light-duty printhead similar to those often found on less expensive machines, and the entire mechanism is slightly loose. After seeing this, I was not optimistic about print quality, but I found it acceptable both for text

and IBM-compatible graphics on the brand new unit I tested.

If I'm going to plunk down roughly \$849 for a printer, though, I want something that at least looks and feels like it's solid enough to stand the test of time. A machine that can't even support its own weight without twisting like the MSP-25 did just doesn't make it in my book.

-Jim Forney

#### **Dynax-Fortis DM20**

The Dynax-Fortis DM20 is a well-built. wide-bodied (16-inch carriage) dot matrix printer that has the added bonus of being IBM compatible. To switch to and from its IBM mode, you simply reset the DIP switches or use printer command se-

One of the first things you notice about the DM20 is its quiet demeanor. The printer is not so quiet as an ink jet or a thermal printer, but it does tend to purr rather than clank along. Strangely enough, though, the printer tested at 75 dBA, not an especially low rating.

The DM20 comes with a number of print enhancement features, including emphasized, double-strike, near letter-quality, and proportional print. It also offers underlining and super- and subscripts as well as elite, double-width, italic, and condensed type styles. Because the code sequences are Epson compatible, you shouldn't have any problem finding software that supports this printer.

The DM20's near letter-quality print is quite acceptable. At a cursory glance, you probably won't even pick up the slight jaggies around the curved letters. When used in conjunction with the proportional print enhancement, it produces first-rate output. The output from the emphasis mode is only a little more prominent than that from the double-strike mode. Even the default print typeface is readable.

The DM20 tested as just under 91 cps in draft mode. While that speed is faster than many of the other dot matrix printers reviewed here, you must remember that, at \$888, you are paying a stiff price for it. The speed test with the near letter-quality mode showed a marked decrease to 21 cps.

The graphics test demonstrated that DM20's graphics are compatible with IBM's. Of equal importance is the DM20's ability to select either of the IBM character sets through the control code escape sequences. In addition, the printer's own graphics are available in standard, double, and quadruple densities and in bit



DM20 Dynax-Fortis 6070 Rickenbucker Rd. Commerce, CA 90040 (213) 727-1227 List Price: \$888 Dim.; 6.3"×25"×13.4" Weight: 37.5 lb. Country: Japan

image mode. The downloadable character feature allows you to custom-define up to 95 individual characters.

In addition to the usual form-feed and line-feed buttons, the front panel has two other switches: one for selecting the characters per inch and another for selecting the line-feed increment. These switches are handy if you need the same printer for both spreadsheets and correspondence.

My main complaint about this printer concerns its documentation. The manual includes tips after every control code, a number of appendixes (including a print enhancement compatibility chart), print samples, and the BASIC program listings for getting them, but it is filled with typos. Although Dynax-Fortis corrects some of these typos in an addendum that comes with the printer, the manual still needs an overhaul. It incorrectly states at least one of the command sequences (how to leave condensed mode). Also, the novice user may become confused with the way it lists codes; for example, instead of stating that emphasized print is Control E, the manual shows Control + E.

shows Control + E.

The DM20 is a well-designed IBM-compatible printer, but its price is a bit high. At \$888, it is slightly more expensive than other printers in its class. But if you can get it for a few hundred dollars less, do so; you won't regret it.

#### MPI Solution Series SX Printer

-Vincent Puglia

What looks like a bowling-ball case and prints at high speed? The MPI (Micro Periperals, Inc.) Solution Series SX Printer. Designed with the traveler in mind, this Popound printer comes with its 119 eps packaged in a tight little carrying case. A charming industry enigma, the printer tackles everything just a little bit different tackles everything just a little bit different of these idiosyncratic quirks will entertain you; others will merely baffle you, or there will merely baffle you, or there will merely baffle you.

Video-game enthusiasts will love MPI's tuneful error and model selection messages. Every time you enable a feature



#### FACT FILE

Solution Series SX Printer MPI (Micro Peripherals, Inc.) 4426 South Century Dr. Salt Lake City, UT 84123 (801) 263-3081 List Prices 2895 Dim.: 7" × 18" × 14.5" Weight: 16 lb. Country: U. S. A.

CIRCLE READER SERVICE NO 658

on the SX Printer, your reward is an R2D2-like musical phrase. Another oddity is the ribbon, which you insert behind rather than in front of the print carriage. (There's no way to keep your hands clean with this backdoor approach.)

The SX Printer also has a trio of paper routes. You can opt for rear, bottom, or front paper feeds. The front paper feed has a lovely automatic sensing device that grabs and positions the paper.

To its credit, the SX Printer contains a built-in Sidewinder program to rotate the print 90 degrees and a repeat mode that allows you to print a document any number of times. Both features require MPI's optional Memory/Mate 64K buffer.

The printer's oddest feature is its Softwhich elaculatorities keypad, which lets you change the pitch and print features. The printer has no DIP switches. Instead, each of the 12 membrane keypads on the control panel sports two different functions. In addition, the keypad has eight standard indicator and forms-handling but-

The Softwirch keypad changes form lengths, print densities, pitch, tabs, and other programmable features through an other programmable features through an other length sepace of keypad entries. For example, to enter into the SX Printer's For example, to enter into the SX Printer's best inter-quality print, you must use the keypad or enter Orf-Line and then press the keypad or enter Orf-Line key. While there is a method to that the state of the sequence of o

People who are unaccustomed to DIP-

switch and escape sequence logic may like MPI's solution. I found it to be an engaging toy I quickly tired of.

The SX Printer has some unusual options. For 339 you can purchase the threedisk Stylewriter software package, which supplies special print styles and forms, screen-dump enhancements, disk labeling, and graphics customization programs for the DOS user. A softcase traveling bag for those who need to lug around 16 pounds of printer is also available.

The printer's nine-wire dot matrix output is less than exceptional. In draft modes the dots look only slightly better than those of a cheap cash register receipt. Print approaches respectability only in the printer's enhanced modes.

as The SX Primer house as near Jetter-quality made and programment of the second by th

Another shortcoming of the SX Printer is its inability to enable an enhanced feature in the middle of a line of text. When you send it a command sequence, the printer always resets to the start of the line. Consequently, you cannot mix features on a single text line. This problem disappears when you're in IBM mode, but you then have the drawbacks noted above.

The MPI SX Printer bills itself as a Solution Series printer. It certainly has some interesting solutions but unfortunately more than its share of problems awaiting solutions. It's an oddball printer, but I could grow to love it if the bugs were eliminated and the output marginally improved.-Robin Raskin

#### Datasouth DW-36

If you're looking for a middle-of-the-road daisywheel printer with a few nice extras, your search may end with Datasouth's new DW-36. A medium-duty machine suitable for home or office use, the DW-36's novelties include a copy function that lets you make multiple copies without tying up your computer and an optional red ribbon. Another plus: Its carriage is wide enough to handle cut sheets up to 161/2 inches

wide. Single-sheet paper feed is by automatic loading. Just drop a sheet down the feed slot until it stops and push the top-of-form switch, and it will feed to a preset position to start printing about 1.2 inches from the top of the page. You can manually finetune where the top line will print with an optional bidirectional tractor that handles fanfold paper.

Print quality of the DW-36 was very good with its fully formed characters. They were clean and almost perfectly aligned. In fact, it took a 30× magnification to reveal underlining as anything but a perfectly straight line.

Want someone to see red? The DW-36 will happily oblige. It prints anything in red, from a single word in the middle of a line to the whole document, when you use the separate red ribbon that's available as an option. And if you really want to get someone's attention, you can emphasize, underline, or scream a bright red "PAST DUE!" or whatever other urgent message you want.

The DW-36 has more buttons and indicators on the control panel than many comparable machines. They are logically labeled, however, and you will not find them at all intimidating.

A button not found on most printersthe "Copy"button-handles one of the DW-36's nice extra features. It allows you to make multiple copies of whatever document you have in the printer's buffer without tying up your computer. The printer comes standard with a healthy 7K buffer and is expandable to 21K-enough to manage a single-spaced document (10nitch) of about five pages.

While the documentation isn't up to par with today's high standards, it is certainly adequate. It is profusely illustrated with clear drawings that leave no question about which little doodad they're talking about.

Datasouth's technical support was good-when I called about a minor problem, the people there were responsive and got me up and running in a hurry.

While the DW-36 does have a couple of nice extra features like the copy function and red ribbon, it's really quite an ordinary machine in terms of performance. It's well suited to the needs of many small offices, but a little comparison shopping would probably be in order before spending \$995 on a medium-duty daisywheel.

-Jim Forney



#### Juki Model 6300

The Juki Model 6300 has the right stuff to make it in today's competitive home/office market. It offers high-quality printing at a reasonable price. On the down side it is not especially fast, and it's machine-gun-like rat-a-tat-tat's might drive your sensitive coworkers to seek shelter elsewhere.

On paper the Juki Model 6300's specifications are impressive. Unfortunately, a spec sheet cannot convey the hammering of the Juki at work or its unimpressive speed. But, at 33 cps the 6300 will give you high quality print you can be proud of, at a cost you can live with

The 6300 is obviously a well-made printer. The daisywheel and printhead mechanisms are substantially built, the friction paper-feed mechanism is strong. and both an optional bidirectional tractor feed and sheet feeder are available. The DIP switches are prominently located and labeled under the front hood.

The printer comes with a 3K RAM buffer with an additional 12K optional. It offers the standard 10-, 12-, and 15-pitch and proportional spacing options as well as a "hyplot" graphics mode, along with an extensive list of Diablo-compatible programmable commands. It uses standard Diablo accessories like daisywheels and ribbons. With Diablo supplies and command sequences, Juki users shouldn't have acquisition or support troubles.

My experience with the \$995 Model 6300 printer was pleasant until I was foiled by its \$14 ribbon and its sharp-toothed print mechanism. It's all too easy for the print mechanism's sharp edges to slice the ribbon, Within 1,000 characters my ribbon was inextricably tom in two. Undaunted, I cracked open the Juki 6100 box, figuring I could borrow a test ribbon from a soul mate. No such luck. The 6100 uses a different ribbon design and thus offers no interdesign compatibility. Calls to Juki, in an effort to secure a new ribbon, placed me on an endless "Please hold while I transfer your call" mode for three days.

The documentation combines attractively designed information with occasional lapses into Japanese/American speak.



#### PL FACT FILE

Model 6300 Juki Office Machine Corp. 23844 Hawthorne Blvd...#101 Torrance. CA 90502 (213) 320-48500 (800) 932-0590 List Price: \$995 Dim.; 4.7" × 22.4" × 15.8" Weight: 30.8 lb. Country; Japan

CIRCLE READER SERVICE NO. 656

My best "for example" actually messed up my test results. In one instance the manual said, "Put switch #5 on if you're using the printer for a language other than English and your computer is an 1BM PC." I also discovered that the Japanese frequently mean "or" when they say "and." Despite its awkward English, the manual is an easy read. Dotted with pretty woodcuts and halftones documenting the history of printers, the Juki Model 6300's manual organizes the chapters according to the type of computer and software you will be using. So, if you use an IBM computer and WordStar, you have a step-by-step installation documented for you. If you use other, less popular computers and software, you'll need to be more ingenious. (Personally, I'd consult my word processing software's "print installation" directions to learn about software installation.)

The 6300 is smaller and faster than its predecessor, the 6100. But I would not classify the Juki Model 6300 as a printer for heavy office use: It's too noisy, not

heavy-duty enough, and it requires too much babysitting for forms handling. If you don't mind the racket and, unlike me, can place your ribbon so that it remains intact, this printer may be right for you. But if it's a whispering printer you're after, look elsewhere.—Robin Raskin

#### CAL-ABCO Legend CP-VII

Just when I thought I'd seen everything in the printer world, I encountered the offbeat Legend CP-VII color printer. The CP-VII uses an interesting colored ink-platen technology, but the ink-impregnated platen printer is a valiant idea that needs more time on the drawing board.

The technology behind the CP-VII works something like this. A large platen holds seven ink-impregnated sintered miniplatens. The miniplatens are held in

place magnetically on the large platen, which is color coded so the colors can be properly placed. The ink platen is positioned in front of the paper, and the printhead matrix wires strike the paper from behind. As the paper hits against the colored platens, the color is transferred.

In theory, this process should produce a very, clear even-colored print. Since there are seven colors to choose from, there's no reason to create unpredictable color combinations and blends. In reality, this topsytury system doesn't seem to exert enough force on the paper to make a crisp impression. (I suspect the printer would probably work better with onionskin-type paper than with the traditional computer paper stock.)

I also found that the miniplatens jam occasionally. When they do, the rescue procedure can be of grave consequence to fingers. At one point red blood from a wounded "platen dejammer" mixed with the colored platens.

the cotoro passens. In Swire printed and The printer uses a well formed, which as legant and well-shaped front. The Legant he legant and well-shaped front. The Legant and well-shaped front. The Legant batton on the front part of with a command sequence. It also offers a full range of pitch and print styles including clite, condensed, double-width, and proportion—and printing. But even in black-and-white, and aprinting. But even in black-and-white, and eagle, blarry quality that is annoying to a feed, a burry quality that is annoying to

The Legend CP-VII printer feeds the paper from either the front or the rear through a paper guide that runs undemeath the belly of the printer. You've got to crouch down and do some crawing to inspect it and get it right. Once in motion, the printer alternates between making grasping sounds reminiscent of a class B horror film and producing a cacophony of hechaws and snorts.

The CP-VII's manual is cumbersome to read, pays no attention to any sort of aesthetic typesetting, and offers only a terse, technical explanation of the color print settings. The manual has no index and never indicates that some software is required to get this color printer to do anything significant. Only after I called CAL-ABCO and



### PART FILE Legend CP-VII

CAL-ABCO 6041 Variel Ave. Woodland Hills, CA 91367 (800) 4LEGEND (818) 704-9100 LISP Price: \$1,195 Dim.: 6.1"×22.4"×14.2" Weight: 35 lb. Country: Japan

CIRCLE READER SERVICE NO 655

### SAM 3001®, THE ALTERNATIVE!

Smart institutional buyers throughout the world have been choosing us as their primary supplier of microcomputers since 1982. That's because here at HiTech, we ofter our customers mainframe consideration on a micro budget.

Now, we are teaming up with SAM-SUNG, the 7 billion-strong Korean giant, to form a unique marketing/manufacturing combination which will make HTech the forerunner when others have already vanished.

Backed by SAMSUNG's stability and the confidence built upon us, we now introduce the SAM 3001 AT. Whether you are a corporation for profit or otherwise, a VAR, OEM or a Systems House, we are equipped to back you with the support you require. Call us to discover the HTech frontier. We are ready to be your partner for the new beginning.

#### STANDARD FEATURES ON SAM 3001

- Genuine IBM AT compatability
   80286 CPU with optional 80287
  - co-processor
    - 8 Expansion Slots, 640K to 1MB RAM on
      - Board

        1.2MB floppy disk drive
      - 30MB voice coll hard disk drive
      - Mono-grophics board with optional RGB
         1 parallel and 2 serial
      - ports

        Optional LAN ond
      - multi-user interface, ond tope back-up • 1 year warranty



Amsterdam O2O 84 31 38 Dusseldorf O211 395O94 London O524 381 423 Poris (1) 597 45 29

IBM is a Trademark of IBM SAMSUNG is a trademark of Samsung Group SAM 2001 is a trademark of Hillech International Hilech International, Inc. 1180-M Miraloma Way Sunnyvale, CA 94086 (408) 738-0601. IX 501422HIT said I couldn't produce color graphics did they mention what software should have accompanied the printer.

The next day I received the hand-labeled disk and the few pages of obscure documentation for it. The software included a memory-resident screen-dump program that outputs to either a wide (fullpage) or narrow (34 inch) printout. This screen-dump program prints the image based on the colors displayed on the screen but does not allow you to customize your print colors. The software did not work consistently, and our results showed better resolution in the narrow mode than in the wide mode

The software also contains a rudimentary draw-and-paint program capable of creating very simple lines, arcs, circles, and points. While the software output was even and well formed, it was also alarmingly washed-out looking, even after I adjusted the print intensity.

The Legend CP-VII is IBM graphics compatible, but not IBM color compatible. So, you can use IBM graphics software to do black-and-white screen dumps, but you must use CAL-ABCO's software to do color screen dumps.

The Legend CP-VII is a good-looking printer that has the potential to do a great deal. Unfortunately, good intentions don't make it in this business. The Legend CP-VII's oddball ink-impregnated platen technology may become a legend in its own time, but its print output will not. -Robin Raskin

#### C. Itoh 24LO

C. Itoh's new 24LO matrix printer should be well received by users of the company's F10 series fully formed character printer. In addition to an F10 emulation mode, the 24LO provides color printing and three print qualities. The 24LQ is fairly expensive, but if you are trying to maintain software compatibility with your existing F10 printer while adding color and high-speed matrix printer capability, it may be right for you.

In its standard (non-F10) mode, C.



FACT FILE 24LQ C. Itoh Digital Products 19750 South Vermont St Torrance, CA 90502 List Price: \$1,295 Dim.: 6"×22.9"×15.2" Weight: 35.3 lb. Country: Japan

Itoh's 24LO has a number of print features. You can print in near letter-quality and correspondence and draft quality and with enhancements that include proportional spacing and boldface. You can also

The 24LO is truly an

island to itself. Its escape codes are

incompatible with anything besides C.

Itoh's F10 series.

underline text, produce super- and subscripts, and print in italic, elite, condensed, or elongated modes. In the F10 mode the 24LQ prints very crisp bold, shadow, and proportional characters and super- and subscripts.

But wait, before you run out and place an order-the printer has some drawbacks. To begin with, the draft quality speed, which we tested at 104 cps, may be fast, but the printed characters are almost illegible. The correspondence and near letter-quality printing are much easier to read, but you lose from one-fourth to onehalf of the speed by printing in the betterquality modes. You will need earplugs when printing high-quality documents because of the screeching noise that 24LQ makes

The 24LO is truly an island to itself.

Not only are its escape codes incompatible with anything besides C. Itoh's F10 series (and only when in that mode), but for a reason I never did figure out, it insists on occasionally sending its own commands to the printhead. If you look at the print sample on the chart, you'll notice that the samples for Power On Default and Correspondence Mode are identical; they should not be. PC Magazine's quality test turns off all enhancement features before the test begins, but the 24LQ switched the Correspondence Mode on at this point when printing the Power On Default sample. The actual default quality is shown in the print-sample test.

The 24LQ prints subscripts and superscripts in a strange and inelegant manner. They are small (about 15 pitch), crisply printed, and easy to read. But since the 24LQ doesn't change the character pitch, they're spaced at 10 pitch and look "toothy" as a result.

The 24LQ is incompatible with IBM graphics standards. Instead of producing a multicolored, or even black-and-white, bar graph, when I tried to dump our standard graphics screen, it spit out two lines of garbled type and an endless stream of form feeds. The printer has two commands for accessing the color capabilities (one for selecting the palette and the other for selecting the actual colors) but requires special software to do color graphics.

On top of all of this, the paper has a strong tendency to frequently jump out of the sprockets, and even with the paper separator properly placed, paper jams were the sad result. The springs holding the paper onto the sprocket wheels aren't strong



#### Statistics, reports and plots happen magically with SPSS/PC -the Statistical Package for IBM PC/XTs.\*

SPSS/PC is the most comprehensive statistical package for performing simple or complex tasks, regardless of data size. It maintains feature and language compatibility with mainframe SPSS: while optimizing for the PC environment.

Statistics range from simple descriptive to complex multivariate, including Multiple Regression, ANOVA. Factor and Cluster analysis. Loglinear and nonparametric procedures are also included.

Simple facilities allow transfer of files between

SPSS/PC and programs like Lotus 1-2-3. dBase II and SAS. A complete Report Writer. Plotting facilities and a Communications program for mainframes round out a fully integrated product.

For more information, contact our Marketing Department without further ado. And see what a little stat magic can do for you.

SPSS Inc., 444 N. Michigan Avenue. Chicago, IL 60611, 312/329-3500. In Europe: SPSS Benelux B.V.,

P.O. Box 115, 4200 AC Gorinchem, The Netherlands, Phone: +31183036711 TWX: 21019.

VISA, MasterCard and American Express accepted.

#### PRODUCTIVITY RAISED TO THE HIGHEST POWER

CIRCLE 172 ON READER SERVICE CARD

enough for the job, and C. Itoh should look into fixing this simple problem and designing a better paper separator as well.

If you already have an FIQ printer and a library of software to support it and are looking for a high-speed color matrix printer, the 24LQ may be it. If you are in the market to buy your first color printer, however, I suggest you look elsewhere for a more compatible product.

—Vincent Puglia

#### NEC Pinwriter P3C

If you want to add color to your life, or at least to your printouts, the NEC Pinwriter P3C is a good place to start. Designed to please the eye with its appearance as well as its printouts, this sleek-looking printer succeeds in both aims.

The P3C uses Epson JX color printer control codes. This is a smart move on NEC's part, since many software companies are already supporting the Epson JX command set because of that printer's popularity. In fact, you can think of the NEC P3C as a high-class Epson JX, with a high-er-quality ribbon, higher-quality output—and a higher printer.

Print speed is not one of the P2C's strong points. The top speed of 84.2 cps isn't bad, but what you get at that speed is draft quality text in which almost each dot seems to be printed individually. The near letter-quality mode is much better, but then the printer slows down to a 20-cps crawl. Although its print quality even at that speed is nothing to get excited about, it is certainly good enough for most purposes.

At any speed the noise level is surprisingly low, best described as a pleasant whisper. If all printers sounded this way, printer reviews wouldn't need to include sound tests.

The instructions in the documentation for the P3C are filled with line drawings that, unfortunately, are not as useful as they might be. The only problem I ran into when using the printer was getting the ribbon to sit right, and this was caused by my misunderstanding the documentation's illustration.

However, NEC's technical support for the printer makes up for any oversight in the documentation. When I had trouble with the ribbon, I called the company and was quickly and courteously given the correct information.

Also, the documentation comes in heavy-weight, loose-leaf pages suitable for fitting into the IBM PC manual. If you have room in the manual, that's fine. If not, you may find it bothersome to keep track of the individual pages.

One warning: A potentially frustrating problem may occur because the tecommands for changing colors are incorrect in the manual. According to NEC, the commands were changed between the times when the manual was printed and when the printer went into production. A note to that effect was supposed to come with the manual, but it was either left out of the review copy or lost in the process of shuffling the individual loose-leaf pages. Again, NEC quickly cleared up the problem.

If you have room in your budget for a separate color printer, you might want to look elsewhere. If you need a reasonably priced printer for both text and color, however, the P3C should exactly fit the bill.

## -M. David Stone Primage 90

The Primage 90 is a class act all the way, while most office quality, fully formed daisywheel printers pound as they print, the Primage 90 purs. The printer has a solid and produces impeccable—quality print. At \$1,402, 1, wouldn't suggest the Primage 90 as a standard home printer, but I would give it a top-notch rating for the office, even if your company's on a tight budget.

The Primage 90 is setting records in the fully formed printer areas for being quick, quiet, and inexpensive. It produces 50-cps print at 10, 12, and 15 pitch as well as proportional spacing. All the printed characters are uniformly crisp and procise. Bringe is the absence of rat-a-ta-tat daisywheel noise. Its high-quality, low-noise print is arributed to something the manufacturer calls "print in flight" technologies.

Daisywheel printers are notoriously noisy and slow because the printhead carrier must be moved and stopped each time the printhead strikes a character. In addition to the noise and inefficiency resulting from the constant stop and go, the carriage mechanism is under enormous stress. The Primage 90 remedies this situation by using a printhead that never stops moving. Because the characters are printed "on the fly," the Primage 90 prints faster and more quietly with less vibration and less overall stress on the system than most daisywheels. The Primage 90 also uses an unusual Teflon-coated lead screw to achieve precision in the carriage movements

Several other features help to make the Primage 90 an extremely valuable printer. The printer is Diablo 630 compatible. In a pinch it can even accommodate a Diablo Hytype ribbon. Primage's proprietary ribbon, however, has been specially opti-



#### Pinwriter P3C

NEC Information Systems, Inc 1414 Missachusetts Ave. Beuthorough, MA 01719 (617) 264-8000 List Price: \$1,399 Dim.: 4.9" × 22.4" × 13.1" Weight: 24.3 lb. Country: Japan

CIRCLE READER SERVICE NO.

#### STATGRAPHICS: ONE KEYSTROKE TURNS LIFELESS DATA...













## NTO VITAL STATIST

Data. You live with it every day. What you need are the tools to make it come alive. Comprehensive analytical tools, Mathematical precision. And graphics capabilities to broaden your insights-to help you visualize, analyze, and communicate your findings quickly and convincingly.

And now you've got it. With STATGRAPHICS—a new PLUS\*WARE™ product from STSC STATGRAPHICS is the only PC software to fully integrate a wide variety of statistical functions with highresolution color graphics. Giving you the power and precision you used to find only with mainframe software. STATGRAPHICS' unique inter-

active environment allows you to generate graphs from within the statistical procedures. You can change a variable and see the effect - im-mediately. So your job is easier and you're more productive.

MORE OPTIONS FOR MORE COMPREHENSIVE ANALYSIS. STATGRAPHICS features over

250 functions for analyzing dataincluding analysis of variance, regression analysis, experimental design, quality control procedures, multivariate techniques, nonparametric methods, and extensive forecasting and time series analysis.

It also lets you enter data at the keyboard or access data stored in standard ASCII files, LOTUS® 1-2-3 worksheets, and DIF files used by other popular software packages.
TELL A CLEARER, MORE
DRAMATIC STORY.

STATGRAPHICS includes a wide variety of graphics programs such as two and three-dimensional line and surface plots, bar and pie charts, histograms, time sequence plots, and

The graphics are supported on color and monochrome graphics boards, dot-matrix printers, and pen plotters for presentation quality graphics.

quality control charts.

SOPHISTICATED STATGRAPHICS IS SURPRISINGLY SIMPLE TO USE

STATGRAPHICS is completely menu-driven, and includes a comprehensive user's guide, online HELP screens, tutorial, and handy reference card. And STSC's HELP-Line is only a phone call away — giving you ready access to our staff of technical experts.

TAKE A LOOK AT
STATGRAPHICS.

AND LOOK NO FURTHER.

STATGRAPHICS is the most advanced statistical graphics software available for PC's. And the complete system is just \$695. To order STATGRAPHICS, or

for more information, contact your local dealer or call 800-592-0050 (in Maryland, 301-984-5123). Or write STSC, Inc., 2115 E. Jefferson St., Rockville, MD 20852. Major credit cards accepted.

Problem-solving at the speed of thought.



#### 10, 20, 33 and 44 MEG INTERNAL AND EXTERNAL HARD DISK SYSTEMS

Quantity 1	10 MEG	20 MEG	33 MEG	44 MEG	
Internal	\$449 \$395	\$549 \$509	\$929	\$1129	
External	\$599 \$545	\$699 \$659	\$1029	\$1229	



10, 20, and 33 Meg Hard Disks are available with combined Floppy/Hard Disk Controller Card for additional \$75.



COMPAQ

DESKRRO **28**6

256K, 1/360K drive, 10 Meg Intern

COMPA



Now using 31/2" shock-mounted Winchester drives. The same as used in the Compaq Plus". Also available with 2 half-height drives and 10 MEG HD-\$2749

Or upgrade your Compaq to a Compaq Pius" equivalent with our 31/2" shock-mounted Winchester disk kit. Inciudes Hard Disk, Controller, Cables, Manual, software, and Mounting Hardware. One year warranty. 🌰

IBM AT"







## DIAL 1-800-426-5150 FOR EASY ACCESS BARGAINS.





AST SixPak Plus

PC'S LIMITED Six Function Care

**256K RAM** Set of 9 chips

w/64K \$249 w/384K \$289 Upgradable to 184k
 Chock/Calendar
 Software included

. Serial Poet

#### COMPAQ

With 20 Mag Internal Hard Drive-\$3595 With 33 Mag Internal Hard Drive-\$3975 With 44 Mag Internal Hard Drive-\$4175

Company's a registered registered, and I company's and a company's series



Irwin Tape **Backup System** 



5595

 Uses Floppy Controller Card
 10.35 Meg Formatied Capacity
 Used in Compaq Designo. SOLVE YOUR POWER PROBLEM.

#### DISK DRIVES



MITSUBISHI

IBM PC AT

TEAC

\$95 PARADISE

You can measure it. Apparer Madelan Longitus II and a constitution of Paparer II and to

#### **INTEL 8087** Math Co-processor



XT POWER 135W

**PRODUCTS** 128K RAM .. \$49 20 MEG terreal Hard Disk \$559

32 MEG Incomel Hard Disk \$720

well-suited for the AT

**OUTSIDE TEXAS, ORDERS ONLY, CALL 1-800-426-5150** 7801 N. Lamar, #E-200, Austin, Yexas 78752 technical support and inside Texas, call (512) 452-0323 In He GIGTBORTER DC LTD

CIRCLE 179 ON READER SERVICE CARD



#### E FACT FILE

Primage 90 Primage, Inc. 1620 Johnson Ave. Bohemia, NY 11716 (\$16) \$67-8200 List Price: \$1,492 Dim.: 7.4"×24.5"×15.5" Weight: \$4 lb. Country: Taiwan

CIRCLE READER SERVICE NO 650

mized for the Primage 90.

The control panel features three banks of DIP switches, all laheled and carefully tucked under a pop-up lid on the front hood. Nine membrane-type buttons give you easy control over a wide selection of options like envelope feeds and sheet feeds. A very complete set of error detection indicators includes ribbon paper, pauses, pairly, and cover off.

The need for a platen knob is climinated since the paper-up and paper-down controls offer the user fifte-tuned paper mainplutations. A manual feed switch inserts or ejects paper and will load paper you insert behind the platen so that the print line is always correctly positioned. The printer has an automatic forms-thickness adjustment, and so you don't need to fiddle with print intensity when you need multiple feature. By intelligently combining symposium of the printer of the pri

The Primage 90 makes luxury printing affordable. You need some type of automatic forms handling, but fortunately Primages offers a variety of reasonably priced options, including a bidirectional tractor feed and single-, double-, or triple-bin sheet feeders. These options cost from \$295 to \$795, which is far less expensive than comparable products.

I found using the manufacturer-supplied Primage I manual (with a skimpy five-page addendum for the Primage 90) as the documentation a bit disconcerting. Certainly the 90, which is faster and quieter than the Primage I, deserves its own manual. The manufacturer assured me that a new, improved, and correct version of the manual has been written specifically for the Primage 90 and will be available shortly.

Speed and quiet are words not frequently used to describe a daisywheel printer. The Primage 90 is ahead of the pack on both counts, outshining printers in its class that cost twice as much.

-Robin Raskin

#### Centronics Printstation 240

Take the Centronics Printstation 240 out of the box, and the first thing you'll notice is its quiet good looks. Put the printer through its paces, and you'll be even more impressed by what it can do.

impressed by what it can do.

What you have in the Printstation 240
are two printers in one—or, more precise-

- 1117777 P

ly, two sets of control codes. This by itself is not unsual. In most printers that have this feature, though, one of the command sets is proprietary and is hardly ever found in other software. In contrast, both command sets—the Epson FX and the Diablo 630—that the 240 uses are widely available. Between them, there is little software—if any—that will not easily work with his notinee.

Unfortunately, Centronics modifies the waters by not identifying the two command sets. Instead of calling the two command sets by name, the manual and the printer controls refer to the Epson command set at the data processing mode and call the Diablo-command set the word processing mode. This becomes confusing in practice: When installing software that the control of the control

Centronics claims that print quality in the word processing mode is slightly higher than in the data processing mode. I'll take their word for it, but I am hard put to see the difference.

Letter quality printing in either mode is good. Iran the quality test in the data processing (Epson) mode, and I'm not sure I if I didn't already know where it came from. Even more impressive, the printer has a proportional spacing feature that adds a nice typeset look, though it's sometimes a little ranged around the edges.

Speed is not the 240's strong point, but it's nothing to be ashamed of, either. The draft quality, high-speed mode does a re-

1 Wall St.

Hudson, NH 03051

(603) 883-0111

Centronics Printstation 240
Centronics Data Computer Corp.

List Price: \$1,495 Dim.: 6.5"×22.4"×14 8" Weight: 5.5 lb. Country: Japan

ORCLE READER SERVICE NO



The faster you can do a job, the faster you can do another. And the more jobs you do, the more money you make

A simple business principle around which we've craftily designed the ITT XTRAM XP.

A personal computer bursting with the speed and power you need to move ahead and stay ahead. Over three and a half times faster and fully compatible with the IBM XT. Twenty-five percent faster than the AT. And twenty-five percent faster than the AT on a Lotus recomputation.

Example. A spreadsheet

that once took 32 seconds to compute now takes a mere 9 seconds.

Time savings for other business tasks are equally

Imagine all the extra muscle of the 80286 Intel microprocessing chip conveniently packaged in a very small space.

And imagine the very same tilt-and-swivel monitor built-in telecommunications port. IBM compatibility and the host of other computer niceties that have made the whole family so successful.

Now stop imagining. And start dialina. Call (800) 321-7661, or in Cal-

ifornia, (800) 368-7300 today. We'll tell you your nearest ITT authorized dealer of the

fastest PC in the known world. The ITT XTRA XP. And call quickly. Before the rest of the business world

passes you by

Faster than you can imagine.



18M XT and AT are registered to

CIRCLE 299 ON READER SERVICE CARD

spectable 84.2 cps at 10 pitch. Letter quality mode manages 59.5 cps.

Noise level measures a little on the high side, but noise quality sounds more like a loud whisper. I wouldn't mind having to stay in the same room with the Printstation 240 while it is printing.

Where the 240 loses points is in its docing the company's failure to identify the two command sets is one example of this problem. Another shortcoming lies in the way that some of the features are explained. Here's a typical example: "Name: emphasized character mode set. Function: This command places the printer in the emphasized character mode."

in the emphasized character mode.

However, by including a print sample for each command, the manual partially remedies these cryptic comments. Another point in its favor is that useful illustrations accommany the installation instructions.

accompany the installation instructions.

And where the manual fails, people take over. I've had good support from Centronics on other printers, and although I did not call Centronics when testing this printer, I have no reason to think that the support they give should have changed.

Overall, the Centronies Printstation 240 is the kind of quality product that builds reputations. At \$1,495, it may not be the deal of the century, but it certainly is a good value. And it is very much the sort of printer you'd want to take home to meet your computer.—M. David Stone

#### Dynax-Fortis DM40

Dynax-Fortis, long noted for its quality typewriters and fully formed character printers, has taken a giant step into the dot matrix market with a very exciting new printer. The DM40's 24-pin printhead delivers output of such high quality that you have to look at it very closely to see that the letters aren't fully formed characters.

The DM40 is an easy machine to set up and use, too. Paper loads easily through the friction platen for single sheets or through a concealed, built-in pusher-pinwheel assembly for fanfold forms.

The typewriter/formed character ancestry of the DM40 is obvious from the layout



of the control panel, which has switches for 10 and 12 pitch and proportional spac-

ing just as you'd expect on a daisywheel.
The DM40 moves at a measured 84 cps in draft mode, which looks better than the so-called "letter quality" printing of some

other machines. When it gets down to serious letter quality business, it clips along at a respectable 58 cps.

The DM40 can be run in either Diablocompatible mode for letter quality printing.

The DM40 can be run in either Diablotic compatible mode for letter quality principal or its own mode for draft printing and agraphics. This choice of compatibility modes can be made either by using parel excited by the principal of the principa

Esc-W, for instance, calls up shadow printing if you are in the letter quality mode. A draft mode Esc-W calls up nothing. Esc-W-I in draft mode produces double width. Esc-W-I in letter quality mode does produce double-width text, but it is an undocumented feature. Most other commands showed no inclination to cross over, however, and most useful enhancements were reserved for the letter quality mode.

You can software-switch between draft and letter quality, but if you do so, you cannot pass enhancements through for the switched mode. Only enhancements for whichever mode you have set by the hardware switches can be used. In short, it's awkward unless your work is such that you

can set your printer in one mode and forget it or if you want to bounce back and forth between modes and really don't care about

the enhancements.

I also found that the DM40 was not IBM compatible for graphics, which is really too bad. You can, of course, do dot-addressable graphics, but you'll have to

have the time and skill to write the program yourself.

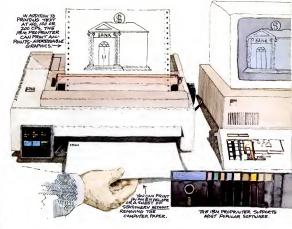
So while Dynax-Fortis has shown its determination to maintain its letter quality

determination to maintain its letter quality standards in its new and sturdy dot matrix printer, I was disappointed by the DM40's inconvenience.—Jim Forney

#### Xerox/Diablo Companion 34LO

As soon as you unpack the sleek new Xerox/Diablo Companion 34LQ dot matrix printer, you'll know it was made in Italy. Its black-and-white exterior and clear plastic covers give it a different look. Although it doesn't run as fast as a Ferrari, it does zip along in its default quality mode. And it comes with both serial and parallel ports.

The Companion 34LQ is one of the growing number of two-mode matrix printers that offer Diablo 630 escape sequence compatibility for near letter-quality printing and Epson compatibility for ex-cything else. In its Diablo letter quality mode the Companion offers bold and shadow enhancements, along with underlining. Superscripts and subscripts are created with half-line and negative half-line



#### Built to take it. Priced to take it with you. The new Proprinter from IBM.

There's just one thing that's as remarkable as the rugged reliability of our newest personal printer—and that's its price.
Under \$550.

The new Proprinter is built by IBM to last. And simplicity of design is what makes it so reliable.

design is what makes it so reliable
Yet the IBM Proprinter is a
full-featured machine. It has
three printing speeds to give you
everything from fast first drafts
to sharp, near-letter-quality correspondence. It takes perforated

computer paper for long jobs and —without removing the paper will easily print on a sheet of stationery or an envelope, thanks to a handy slot in front.

a nandy slot in front.
With its all-points-addressable graphics and its comprehensive character set, the IBM Proprinter

supports most popular software. The new Proprinter attaches to every IBM PC and to other leading personal computers. And it's just part of our growing family of personal printers. All are designed to serve a single purpose: To give everything you do the finishing touch.

For the IBM Product Center or authorized dealer nearest you —or for free literature—call 1800 IBM-2468. Ext. 141/LH. Or contact your IBM marketing representative.

IBM

#### IBM Personal Printers...The Finishing Touch

feeds, just like a genuine Diablo daisywheel. In Epson mode the 34LQ gives you emphasized and double-strike enhancements, underlining, superscripts and subscripts, and italic characters. You can also access near letter-quality, condensed, double-width, and elite prints when in Epson mode.

The graphics test demonstrated that the Companion 34LQ is compatible in its Epson mode but not in its Diablo mode. The most difficult sapect of the escape sequences is that, while the codes for accessing letter quality, eiler print, and some of the (nonstandard) line feed options are, according to the documentation, the same for both modes, they work only in the IBM/ Enson mode.

PC Magazine's speed test rated the Companion 34LQ's default quality mode at 138 cps. When we tested it with the letter quality feature, speed dropped to just over 41.5 cps. We rated the noise level at 79 dBA (considerably higher than that of many other matrix printers). The sound reminded me of a rusty playeround swing.

miniment me or a russy pinyground swing. The printer's control panel juts out over an inch from the front of the case so you have to be careful when standing in front of it, or you may find yourself in need of first aid. Also, the panel is poorly attached to the case; it's actually soldered to the printer's circuit care.

The panel allows you to switch between Diablo and IBM/Epson modes, select letter quality, and cancel or reinitialize the printer. You can select such features with a button at the front of the machine. This feature is definitely an advantage if you want to use both modes.



PACT FILE

Toshiba P351 Toshiba America, Inc. 2441 Michele Dr Tustin, CA 92680 (714) 730-5000 List Price: Parallel, \$1,895:

List Price: Parallel, \$1,89 serial and parallel, \$1,945 Dim.: 5.9"×22"×15" Weight: 33 lb. Country: Japan

OROLE READER SERVICE NO 648

Diablo may call the model 34LQ the Companion, but for \$1,599, this paisano does not offer the right kind of companionship. Its near letter-quality print is nice but not outstanding among this year's largecrop of near letter-quality matrix printers. Its physical design is interesting but no match for some of Italy's other exports. —Vincent Puels.

#### Toshiba P351

When PC Magazine reviewed the Toshiba P1351 last year, we reported that the largest problem we encountered was extriciaing the printer from editor Bill Machrone's office. This year Machrone gladly tossed us the old P1351, but now we faced the battle of getting him to begradgingly spare the newer, better Toshiba P351: "3-in-ONE" printer. While the new model name may have lot at thousand points, the printer itself has gone from excellent to superior in quality.

in quanty.

Like its P1351 ancestor, the Toshiba P351 combines high-speed printing (To-biba calaima 28e cp., we tested 106 cps, and such as a part of the part of

The new P351 printer is lighter in weight (33 pounds, down from 41 pounds) and has only half as many moving parts as its P1351 predecessor. As LSI technology improves, Toshiba apparently adapts. The P351's emulation of the Qume Sprint II makes it easy to configure for most popular applications packages.

Combined with its speed, high-quality coptum, and method to design is the printer's versatility. "Fonat's its the P515' is middle name. The P151' could support measure the P151' could support to the P151' could support to could be presented by the P151' could support to could be presented by the P151' could support to consider the P151' could be presented by the P151' could be p151' could

The P351's cartridge fonts pop into a convenient slot in the rear of the printer. The optional cartridges (two fonts on a cartridge sell for \$49.95) behave like down-



Companion 34LQ Xenox Diablo Systems, Inc. 901 Page Ave. 901 Page Ave. P.O. Box 0300 Fremont, CA 94537 (415) 498-7000 List Prices 51,599 Dim: 8" x 25" x 15.3" Weight: 37 B. Country: Italy

#### \$1,945 TO \$1,990

loadable character sets, responding to all escape commands. I had a great time playing with the APL, scientific, and Gothic character sets. When these are coupled with print features like bold, shadow, and clongated print, the possibilities are endless.

sees.

It is a constitute of the downloadble or carridge fronts, the Toolsha PS3 till offers four accessible, attractive fonts still offers four accessible, attractive fonts to the constitute of the consti

The Toshiba P351 is a solid machine. The pin-feed sprockets are so well built that it hurt when they accidentally closed on my finger. The friction-feed paper load is semiautomatic, with the paper release lever inserting the paper. Office users would benefit by using the optional bidimental paper when the paper is the paper. Office users would benefit by using the optional bidimental paper. Office users the paper of the paper. Office users would benefit by using the optional bidimental paper. The paper is the paper of the paper. The paper is the paper is the paper of the paper is a solid paper. The paper is a solid paper is a solid paper in the paper is a solid paper. The paper is a solid paper is a solid paper in the paper in the paper is a solid paper in the paper in the paper is a solid paper in the paper in the

Now for the laments. First, the new Toshiba P351 DIP switches have been relocated from the front to the back of the printer, so setting a switch requires some body contortions. Second, at review time Toshiba offers only a fabric ribbon for the P351. Toshiba is regotating for the manufacture of the multistrike ribbon, which should produce extraordinary results.

should produce extraordinary results. Finally, although Toshiba claims that setting a DIP switch makes the P351 IBM compatible, this just isn't so. Despite the veritable fountain of fonts supplied with the production of the cateries and is incapable of an IBM graphies screen dump. The P351's character sets contain only 128 characters (96 ASCII and 32 other).

Toshiba is setting an impressive example for the dot matrix world. With output like the P351's, offices can reasonably depend on dot matrix, correspondence qualty output. As a result, daisywheels may become history. Clean, letter quality text, high-speed, versatile font and print feature offerings, high-density graphics capabilities—all these make the Toshiba P351 the closest thing I've seen to a general-purpose printer.

Why they call it the "3-in-ONE" is still not entirely clear to me, but I suspect that the Toshiba P351 will be Number One in many PC users' books.—Robin Raskin

#### NEC Spinwriter 8850

NEC's new Spinwriter 8850 is its best offering yet for the IBM-compatible crowd—no mean feat when you consider that the company's Spinwriter series has enjoyed longstanding and considerable success in the office environment. The type of features the new 8850 sports is illustrated by its "modular" design approach, which enables users to choose machine compatibility through the installation of a plug-in module.

The 8850 produces sharp letter-quality test as 4 deys. In addition to NEC's tripletional 10, 12-, and 15-ep pints, the 8850 can print proportionally, and it can print proportionally, and it can be a print proportionally, and it can be a considered to the control of the contro

Weighing in at 37½ pounds, the 8850 is one of the heaviest printers in its class. Its hefty build and industrial-strength de-

sign make it a likely candidate for the office. The only detraction is the exceptionally loud and sharp sound it produces.

The NEC Spinwriter 8850 uses 128character thimbles rather than daisywheels. I find thimbles easier to instal, less delicate to handle, and more secure than daisywheels. NEC's large selection of thimbles is an industry first.

The 8850's attractive front panel lets you select any pitch or form length by pressing a membrane-type button. Your pitch endoire is illuminated, and your form length choice displayed in an LED window. Unfortunately, if you don't use an auto-sense thimble, you must reselect the manual print mode after every printer reselect. A 10-pitch efault setting would eliminate this constant pitch "babysiting." The NEC 8850 views you a few bizarre

"Interest." on Styles you alrew dozume interest. The styles are styles and the styles "From length" inclinated. Increaved one message that flashed "FE" accompanied by the printer's butting down. After 1 played acronym games and thought about the chemical symbol for iron, "Feld Engither the styles of the styles of the styles while. I found the answer embedded deep while. I found the answer embedded deep while. I found the answer embedded while I found the answer embedded while I found the answer embedded while. I found the message agreement of the panel if a non-auto-sensing thimble has been installed, I never old guess what "1 dt".

As with any rubber platen printer, an optional forms-handling device is recommended. With the bidirectional tractor feed, the mechanism gave a tight fit but ripoled the paper a bit.

The NEC 8850 suffers from a classic



#### THACT FILE

NEC Spinwriter 8850 NEC Information Systems. Inc. 1414 Massechnestts Ave. Boxborough, MA 01719 (617) 264-8000 List Price: \$1,990 Dim.: 6.9" × 22.4" × 16.3" Weight: 37.5 lb. Country: Japan

CIRCLE READER SERVICE NO. 64

## Devastating deal

#### ✓ Denotes IBM-AT compatibility.

#### SOFTWARE

We only carry the latest versions of products Version numbers in our ads are current at press time

Rainbow Writer Color Text Formatter 2 1 Rainbow Writer Screen Grabber 1.1 ColorScreenPrint 2 0. Ashton-Tate dBase III 1.1	69 59 call	comprehensive, reliable evaluations its analyses and reviews are completely unbased — they eccept no advertising if you are preparing to make a substantial investment in one or more software programs, we recommend you
Framework 1.1	call	read SOFTWARE DIGEST's evaluation
Best Progrems		first, 1985's issues evaluate the following
PC/Fixed Asset System 3 0	329	programs: Word Processors, File
PC/Tax Out (for 1984 taxes)	49	Management, Datebase Management,
Bible Research		Soreadsheets, Graphics, Integrated
-THE WORD 3.0 (KJV Bible)	145	Accounting, Project Management
-THE WORD 3.0 (NIV Bible)		Communications, Integrated Productivity.
Borland International		
-Sidekick 1.5 (non-protected).	48	Single copy (specify topic) \$1850
-Turbo Pascal 3.0	37.	The cost of your first issue, \$18.50, can
-Turbo Pascal 3.0 w/BCD	59	be deducted from the price of a year
-Turbo 8087 3.0		subscription.
-Turbo 8087 3.0 w/BCD	72	
-Turbo Toolbox 1.0	30	Year subscription (10 issues). \$185 00
Graphics Toolbox 1 0	30	Actually includes 20 issues the 10
-Turbo Tutor 1.0	19	previous issues, in e binder, and the 10
Superkey 1 0	37	upcoming issues.
Connecticut Software	0,	
Printer Boss 5.0	QQ	MultiMate International
-Sideline 5.0 (more features than Sideway)	s) 37	-MutiMate 33
Digital Research	0, 0,	Peter Norton
GEM Desktop 1.1	30	
-GEM Draw 1 0 (includes GEM Desktop)	02	-Norton Utilities 3 0
		Powerbase Systems Powerbase 2.1 2:
Sideways 2 11	27	Powerbase 2.1
Harvard Software	37.	Rosesoft
Harvard Total Project Manager 1.0	270	Prokey 40.
IMSI	210	Satellite Software
-PC Paintbrush 2.8	69	-WordPerfect 4 0 2
Infocom	09	
Cornerstone 1.0	289	
Lifetree	200	Software Publishing
Volkswriter Deluxe 2.2 (with TextMerge)	159	-PFSFile B:01
Living Videotext	139	PFS.Graph B.01.
ThinkTank 2.0	109	→PFS Graph B 01 →PFS Pran A 01 →PFS Proof B 00 →PFS Report B 01
Micro Education (MECA)	109	PFS Proof B 00
-Managing Your Money 1.52	99	PFS Heport Bi01
Micropro	39	-PFS Write Bi01
-WordStar 3 31	179	TRAINING
Hard disk recommended for Wordstar	1/9	
2000 & Wordstar 2000 Plus		ATI
		SKILL BUILDER PROGRAMS
-WordStar 2000 1.01	259	Intro and How To Use
-WordSter 2000 Plus 1 01	299	Word Processing MS-DOS
Microrim		Business Software PC-DOS
R:base 5000 1.0	369	Data Bases Home Accountant Compaq WW Deluxe IBM-PC BASIC
Upgrade Kit to H base 5000	129	Compaq VW Deluxe
Extended Report Writer 1.2.	85	IBM-PC BASIC
-Clout 2 0	135	
Microsoft		TRAINING POWER PROGRAMS
-Multiplan 1 2	125	How to Use
-Microsoft Word 20	235	dBase II dBase III Lotus 1-2-3
-Microsoft Project 1.01	155.	MS Word Easywriter II Multimate
Microsoft Chart 1.01		Multiplan Suppressio 2 Eramounts

-Microsoft Chart 1.01....

Microstuf

∠Crosstalk XVI 3.5

#### PC Connection Software Special through September 30, 1985 SOFTWARE DIGEST RATINGS NEWSLETTER

This publication is unparalleled for its comprehensive, reliable evaluations Its analyses and reviews are completely unbiased - they eccept no advertising If you are preparing to make a substantial investment in one or more software programs, we recommend you read SOFTWARE DIGEST's evaluation first, 1985's issues evaluate the following programs: Word Processors, File Management, Datebase Management Spreadsheets, Graphics, Integrated Accounting, Project Management,

#### MultiMate International MultiMate 3.3 Peter Norton Norton Utilities 3.0 Owerbase Systems Owerbase 2.1

Multiplan Supercalc 3 Framework TKISchier Symphony Wordstar each 49 -Survival Kit (includes Intro to the PC, Intro to PC-DOS, & Intro to Business Software) 79 Individual Software -The Instructor II →Professor DOS -Tutorial Set (both items above) Professor Pixel . .

-Typing Instructor

call

59

239

89

239

call

84

84

59

84

#### **EDUCATIONAL**

35

47

75

47

30

Digital Research OwlCat SAT (15 hour) . OwlCat SAT (60 hour). 169 Stone (requires graphics board) My Letters, Numbers, Words (ages 1-5) Kids Stuff (ages 3 to 8) 29 Across the U.S.A. (ages 5 and up) 22 GAMES

Blue Chip Millionaire 32 Broderbund Lode Runner 25 Hayden Software Sargon III Microsoft Flight Simulator 2.12 (now works on Hercules Mono Card) 32 Origin Systems Ultima III 39 **PCSoftware** -Championship Blackiack 23

#### HARDWARE

Spectrum Holobyte

-GATO

Curtia

**ACCESSORIES** 

PC Pedestal (for IBM Mono or Color)

Low Profile Tilt and Swivel Pedestal

Ad-2 Adapter for Portables

System Stand

AST Research (For IBM-PC or XT) All AST Boards come with SuperDrive. SuperSpool, and one year warranty. SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports & now includes Borland Sidekick version 1.5 (non-protected) game port optional MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and senal port (parallel, game, or second senal port optional) ... I/O Plus II with clock calender and serial port (parallel, game, or second seriel port optional) 125 Parallel, Game, or second Senal Port for any AST board (specify board) . . . 36 AST-5251-11 AST-3780 709 589 Amdek -Video 300G monitor (green) . . 139 -Video 300A monitor (amber) ... 149 →Video 310A monitor (amber) 179 Plastic Keyboard & Drive Cover Set 17 -IBM Mono Screen Enhancement

37

15

\* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY DEFECTIVE HARDWAPE REPLACED OR REPAIRED AT OUR DISCRETION SOME ITEMS HAVE WARRANTIES UP TO FIVE YEARS \*COPYRIGHT MICRO CONNECTION INC. 1985 ALL ITEMS SUBJECT TO DVALABILITY PRICES SUBJECT TO CHANGE WITHOUT NOTICE MIGRO CONNECTION IS A TRADEMARK OF MIGRO CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK OF MIGRO CONNECTION INC. MARLOW NA

## dynamite delivery.

System Stand for IBM-AT  Static Mat  The Crystal 150-watt  \$  The Crystal 300-watt  \$  \$  \$  \$  \$  \$  \$  \$  \$  \$  \$  \$	27. pecial
CABLES Extension Cables for IBM Mono Display Keyboard Extension Cable (3 to 9 feet) AC Plug Adapter (any monitor to your F Printer to IBM Cable (specify printer) Smartmodem-to-IBM Ceble	27. C) 8
SURGE SUPPRESSORS All surge suppressors heve an oniolf sv Diamond (6 outlets) -Emerald (6 outlets; 6 ft cord) -Sapphre (3 outlets; EMIRFI filtered) -Huby (6 outlets; EMIRFI filtered)	32 39 52
Epson All Epson printers have built in graphics capability. In addition, the LX80, FX85, FX185 can all print in near letter quality (f +Xx80, FX100 -FXx100 -FXx85 (replaces FX-80+)	and VLQ).
→+X-185 (replaces FX-100+)	call call
Smertmodem 300 . Smertmodem 1200 (wSmertcom II) . Smertmodem 2400 (wSmertcom III) . Smartmodem 2400 . Smartcom II 21 (software) .	149 399 369 call 89
Hercules Hercules Graphics Card (parallel port) Hercules Color Card (parallel port)	309 169
PC Mouse w/PC Paintbrush 2.8 key tronic	119
Deluxe keyboard (KB 5151)	169
Joystick Maynard Electronics	35.
Floppy Drive Controller	119
PC Mouse (w/software, pad, & PC Paint) Orchid Technologies	139
All Orchid Boards come with PCnet Dry (Ram disk) PCnet spool (print spooling) disk caching & partitioning Blossom 64k upgradeable to 384k,	ne
with clock calendar, senal and parallel ports. PCnet Daughter Board (piggybacks to Blossom) with version 3.0 networking	199
software	call
Paradise Systems -Modular Graphics Card	
Princeton Graphics	
"HX-12 RGB monitor (690 x 240)	call
MAX-12E Amber monochrome monitor	call
Quadram Expanded Quadiboard with clock calend	tar.

#### PC Connection Hardware Special expires September 30, 1985

#### CURTIS MANUFACTURING The Crystal (Brown-Out Protection Device)

Experts are predicting that during the summer and fell of '85 the incidence of brown-outs will exceed that of phone line

- disturbances (is that possible?) · Protects during power sags, though it IS NOT A POWER BACKUP
- Protects against surges (over-voltage) EMI/BFI Filtering

Safety amp meter indicates overload Unit has 4 outlets, one on/off switch Lifetime warranty

150-watt \$123 -300-watt 146

#### **OUR POLICY** We accept VISA end MASTERCARD.

- No surcharge added for charge cards. . Your card is not charged until we ship. . If we must ship a partial order, we never cherge freight on the shipment(s) that
  - complete the order No sales tax All shipments insured, no additional charge.
- · Allow 1 week for personal and company checks to clear . COD max. \$1000. Cash or certified check.
- UPS Next-Dey-Air available. 120 day guarantee on all products." To order, call us anytime Mondey thru Fridey 9:00 to 9:00, or Saturday 9:00 to 5:30.
  - You can call our business offices at 603/446-3383 Mondey thru Friday 9:00 to 5:30

#### SHIPPING

Continental US: For monitors, printers, and drives, edd 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, edd \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air et no extre charge if you are more than two days from us by UPS ground. Hawaii: For monitors, printers, and drives, actuel UPS Blue charge will be edded. For ell other items, add \$2 per order. Alaska and Outside Continental US: Call 603/446-3383 for informa-

#### CIRCLE 339 ON READER SERVICE CARD PC Connection 135M

6 Mill St., Merlow, NH 03456 603/446-3383

For the IBM-PC Exclusively.

parallel, & seriel port, I/O brecket, and Quadmaster software 64k upyredeeble to 384k 384k (fully populated).

Microfazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k 159 SMA (Systems Management) PC-Documate Keyboard Templates available for:

\$199

249

DOS/Besic 1.1 Supercalc 3 DOS/Basic 2.0-2.1 Wordstan DOS 3, 3.1 Wordstar 2000 -Lotus 1-2-3 Turbo Pascal Symphony --WordPerfect Multiplan (IBM) dBase II Multiplan (Microsoft) -dBase III. Fremowork -Multimate eech 12 Volkswriter Deluxe

VisiCorp "Visi Mouse (2 button Mouse Systems mouse. PC Paint 1.0 & pop-up menu software 3.0) 89

#### DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results They ere shipped with complete step-by-step installation instructions. Drives are 320k/360k. Control Data (CDC) (5¼1) full-height drive (DS.DD) ...

Free mounting bracket with each pair of helf-heights. IOMEGA Bernouli Box 20 Meg . 2489 ≥10 Meg cartridge.... 48

TM 100-2 (51/4") full-height drive (DS.DD)109 10 Meg Internel Hard Drive w/controller 479 TEAC

FD-55B (51/4") half-height drive (DS.DD) 109 Free mounting bracket with each pair of helf-heights.

#### MEMORY 64k Memory Upgrade Set for IBM-PC

or XT system board (9 chips) 10 64k Memory Upgrade Set for any memory board specify make of board (9 chips) 10 Install memory upgrades & run diagnostics at time of board purchase only 10 256k Memory Upgrade Set for any IBM-AT memory board (9 chips) 49 ≥128k Memory Upgrade Set for IBM-AT System Board (18 chips piggyback) 40

#### DISKS

Disks for IBM-AT (96-TPI) Box of 10. 39 MAXELL Disks for IBM-AT (96-TPI) Box of 10 Verbatim Datalife Disks SS/DD Box of 10 . 21

-Datatile Disks DS/DD Box of 10 25 -Disks for IBM-AT (96-TPI) Box of 10 -Flip Sort (holds 75 disks) 15

case of good print quality combined with medicine regrommics. Its clanking prohibits nearby comersation. To survive in the same room with the NEC 8850, you might need to learn sign language or use a cover to muffle the clack-clack. You can console yourself that it's for a good cause, though—the clean-looking type it so loudly produces.—Robin Raskin

#### CIE CI-3500 Model 20 TriPrinter

Last year, PC Magazine tested a beta model of the CIE C1-3500 Model 20 printer. This year we put the production model through its paces. What we found was a very impressive-looking, very quick dot matrix printer with features that make it a

machine for both today and tomorrow The CIE CI-3500 Model 20, subtitled the TriPrinter, offers a number of typeface enhancements and sizes. The sizes range from 5 to 17.1 cpi; the enhancements include the usual double-strike, bold, underlining, condensed, and double-width characters. (As was noted in last year's review, there's very little difference between the double-strike and bold features.) The CIE TriPrinter gives you letter quality print and, perhaps most noteworthy, a doubleheight typeface. (Be sure to allow for fewer lines per inch when you use this feature. or you'll end up printing part of the characters on the line above.)

Although I have seen better letter quality outputs from other dot matrix printers, the output from the CI-3500 TriPrinter looks quite respectable. The characters are well formed and distinct. The only exception is an occasional filling in of the lower-

To say this printer is fast is an understatement. The default print speed tested at almost 247 cps. I nearly didn't have time to hit a key to stop the program. Nor is the letter quality speed anything to scoff at. It rated approximately 74 cps, which is faster than some dot matrix printers do in their default mode.

While a number of printers have font modules, the CI-3500 TriPrinter is one of



C1-3500 Model 20 TriPrinter CIE Terminals 2505 McCabe Way Irvine, CA 92714 (714) 660-1421

(714) 600-1421 List Price: \$1,995; \$165 for additional interface/font cartridge kit Dim.; 4.7"×22"×16.5" Weight: 38.8 lb. Country: Japan CIRCLE PEADER SERVICE NO. 6:

the few with an interface module. At present, three interface cartridges are available. They allow the TriPrinter to emulate serial, parallel, and line printers. Each module kit costs \$165 and comes with one font module, which includes 16K of RAM for downloading characters or extending

To say the CIE CI-3500 Model 20 TriPrinter is fast is an

understatement. The default speed tested at

almost 247 cps.

the printer's normal 2K buffer. At present, no additional font modules are available. However, CIE says that it will custommake any font on request.

make any fort on request.

The Citizen This fort gain and the special properties of the properties of

download characters, or extend the normal 2K buffer by another 16K. You can also initialize the printer to print in condensed, pica, or elite type.

Saill, certain aspects about the printer and CIE make ne hesiant to recommend the CI-3500 wholeheartedly. Some of my reservations relate to my own likes and dis-likes. The cover, for example, locks into place when raised, freeing both hands for manipulating the tractor and the paper. This feature was obviously designed, freeing both hands for manipulating the tractor and the paper. This feature was obviously designed, freeing both hands for manipulating the tractor and the paper. This feature was obviously designed from the force of the property of the property of the paper of the property of the paper of the property of the paper of

A more universal drawback is the noise level. Although the noise test dessrt is show it (if tested at 78/77, a rating well within the range of other printers), this printer is noisy. Not only does the C1-3500's fan drown out the PC's reassuring but tedious hum, when the printer dumps graphics, it sounds like a souped-up 1956 Chevy striping its gears while trying to jump the flag.

My major reservation concerns CEPs support. When I called the company to ask about the retail price and other basic informamation, the person manning the "Information Peak" told me that he didn't have any information on hand and that I should speak to a sales rep. I made two more longdistance calls, nor to the West Coast and one to the Northeast, before I found somenee with some basic information. Still, this person couldn't tell me which four modules would be forthcoming.

I will gladly rescind my major reservation if CIE improves the level of its telephone support. For despite my personal objections and the noise level, if you've ever wanted to print a document with oversize initial letters, if you'd rather be out the door than waiting for a document to finish printing, or if you want features galore and front-panel programmability, the CI-3500 is the printer you're looking for.

-Vincent Puglia

#### Genicom 3310

The Genicom 3310 is the printer version of the classic tale of Beauty and the Beast. It's a beauty to look at and a beast to use.

It's a beauty to look at and a beast to use. The printer's beauty comes from its design, which reflects attention to detail. For starters, the Genicom 3310 has a pop-off top that really works, unlike the ones on other printers that merely fall off. The carridge ribbon even has a built in reinker.

Paper is fed from a slot in the rear through a pin-fed mechanism. The lower friction rollers are retractable, and you can lock them down when they are not beau used for single-sheet feeds. The 3310 has upper friction rollers to receive and lock the paper into place. Your paper inst 1 going to wander anywhere with its paper feed.

With the Genicom 3310, you use an interesting approach to configure printer features. To begin with, you use the two witches undermeath the printer's bood to select printer operations and forms setups, to control panel that allows you to program the printer's features. When you enter the programming mode by pressing a keypad button, you get a printout of the configuration menu. You can either print last of features for any item on the configution on the control panel. It is not present to the to the control panel. It is not present to the control panel. It is not present the printer of the top of the printer of the printer of the printer of the top of the printer of the printer

Unfortunately, you can't rely on the membrane buttons, and so the front-panel operations don't go smoothly. Supposed-ly, when you hold down the line-feed button, you get continuous line feeds. Not true. The most line feeds I could produce were three or four, and then the machine stopped cooperating.

The heart of the 3310's beastly side lies



Genicom 3310

Genicom Corp.
One General Electric Dr.
Waynesboro. VA 22980-1999
(703) 949-1000
List Price: \$1,995
Dim.: 6.3" × 25" × 16.1"
Weight: 33 lb.
Country: U.S.A.

in its disastrous documentation. The manual that accompanies the printer is the same one that covers the entire Genicom series, including color printers, printers with near letter quality, printers with Epson emulation, and others. It contains virtually no information about the 3310 series

The 3310's beastly side

is its disastrous

documentation that contains virtually no information about the

escape sequences.

escape sequences, and as it turns out, almost none of the examples in the manual apply to the 3310. This manual is, at best, a disservice to all Genicom printer users.

The company confirmed that the escape sequences documented in the manual are invalid and helped me identify the features that lie hidden in the 3310. I managed to get through the weird (ANSI) escape commands for print modes, including bold, unmands for print modes, including bold, unsupposed to the derscore, and proportional print, but was symied when I tited to use the 3310's various fonts.

Printing the configuration menu re-

vealed that a draft font, a Courier font, two optical-character fonts, a compressed draft, and a compressed near letter-quality print were possible somehow. Genicom told me to add 10 to the numbers on the printer configuration menu and to use that number in escape sequence to enable the features. That tactic proved useless. I finally abandoned the task, concluding that no one in his right mind would try to fabricate the correct program sequences for these forts.

I had better luck using the font button on the front panel to select the LQ and L2 fonts; they produced unimpressive letter quality print, despite the fact that the manual doesn't even mention them.

The 3310 is fast enough in draft quality mode at 143 cps, but it dropped down to 20 cps in near letter-quality mode. I could live with the slow speed but not with the quality of the output. The fort is pitiful, and the t's and w's are so strange looking that they seemed to glare at me when I scanned the page.

Being a sucker for good looks and new ways to program a printer's features, I wanted to love this printer. But, even though you could tame the Genicom 3310 beasties somewhat, the effort is hardly worth it. For \$1,995 I wouldn't bother—

#### Hermes Personal Computer Printer 1

The Hermes Personal Computer Printer I comes from Switzerland, and it lives up to the Swiss reputation for fine craftsman-ship. At 48 pounds, it's a monster of a ma-

## THE AMERICAN BUS NEVER LOOK

#### SONY BRINGS THE BRILLIANCE OF TRINITRON\*

TO COMPUTER MONITORS. From now on, business people all across America can enjoy all their favorite programs on a Sony Trinitron.

Because Sony proudly unveils the first computer monitors in the world endowed with Trinitron technology, RGB monitors which, in the laudatory words of Computer Buyer's Guide and Handbook, give you "crisp, bril-liant, utterly flicker-free images that take the eyestrain and headaches out of both color graphics and text or data processing

We've achieved this through technological breakthroughs that literally divide the computer-monitor world in half: Sony's. and all the others'.

First, the patented one-gun, one-lens Trinitron system itself. with a picture sovivid, so critically of text-to 13"-a model that lets lifelike, it's become a legend.

Second, Sony Trinitron's exclusive Super Fine Pitch" Aperture Grille. It dramatically increases the number of red, green and blue electrons reach-

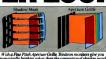
ing your screen. dramatically Which dramatically increases the vibrance and brightness of the colors reaching your eyes. And third, a dot pitch so

fine the horizontal resolution of a Sony is not only the highest in its class, but "close to that of models costing twice as much" (Computer Buyer's Guide and Handbook).

this extraordinary picture quality on screens ranging from 9"-the first ultracompact mon-Typical coarse dot pitch vs. Sony Trinitron super-fine dot pitch.

itor in the business capable of displaying 2000 characters you switch from software to

You can enjoy



hter colors than the conventional s soaps at will by merging a computer monitor and full-feature TV into a single unit.

They're all compatible with the IBM PC, Portable PC, PC/ XT and PC/AT through built-in RGB circuitry. And compatible with most Apple\* and other personal computers through optional accessories.

So call Sony for further information at 1-800-222-0878 (In New Jersey, 1-800-222-0879). Because there's no longer

any reason to view your technologically-advanced computer through a technologicallydeprived monitor.

#### SONY

Information Products



## INESS PICTURE HAS ED BRIGHTER.







FACT FILE

Personal Computer Printer I Hermes Precisa International SA 1900 Lower Road Landen, N107036 (212) 574-0300 List Price: \$1,995 Dim.: 11.3" × 24.4" × 16.8" Weight: 48 lb. Country: Switzerland

CROLE READER SERVICE NO 644

chine, well built and sturdy. It looks good, has clean styling, and can probably take a real beating in the office. (One source of printer abuse—the manual roller—has been elliminated entirely: you can control the roller only from the front-panel but-

tons.)
Loading the paper through the standard
Loading the paper through the standard
bidirectional tractor is complex at first, but
once accomplished, the procedure is logical and easy to get used to. You may not up
out of the fussing with the paper. During our tests, the Hermes PC 1, as it's
called, had no problems at all with paper
foeding.

The carriage will accept 14-inch-wide paper for supersized spreadsheets. Oneand two-bin sheet feeders are available as optional add-ons.

On the decrease PC is very nearly IBM compatible. It prists the extended character set and uses thick lines for double-line argaphics symbols. The IBM Graphics Printer control sequences are also nearly objectived, with a few extrast thrown in as bonuses. In addition to the ubiquitous double-width characters, the Hermess PC I adds double height, which can be used by the control of the printed of with the printed for with double-width. Elms type is substituted for the IBM/Epson double-strike mode.

Printing a graphics display from the screen with the PC-DOS GRAPHICS program loaded works just fine. Filmsier machines are apt to show paper slippage with this test, but the Hermes PC I lives up to its Swiss heritage and runs like clockwork.

Now for the bad news: The print quality

is no great shakes. It would be fine for a printer one-quarter the cost, but not for a two-grand machine. The correspondence quality prints only at 12 cpi, and it looks like the type of print now available in lower-cost Janonese printers.

Double-width print is particularly dotty, and it must be combined with the emphasized mode to look decent. The most dynamic look can be obtained by combine ing double width, double height, and emphasized. If everyone who sees your decuments has grown blass' about the IBM/Epson double width, this is the type face to attract attention.

The manual is a tiny 56 pages, designed to fit in your Guide to Operations. It contains all the set-up information, operation procedures, and control sequences for the various printing modes, but no real specifications on the printer.

Buried in the text you'll find that 200 cps is claimed for the default print and 100 cps for correspondence quality. PC Magazine's speed tests for these modes yielded 128 cps and 86 cps, respectively.

The printer's print speeds are not bad, but at the same cost, you could do a lot better, especially considering the disappointing print quality. Others you have a Swiss bank account from which to draw the 51,995 for this Swiss export, you might want to check the market a little more closely before you decide on the Hermes PC 1.—Charles Petzold

#### Centronics Printstation 351 PC

The Centronics Printstation 351 PC is the starting-gate favorite at the printer race-way. Measured at 143.88 cps in data mode, form feeds are so fast that they can be terrifying if you're not used to running in the fast lane. The 351 PC is a powerful dot matrix printer solidly built for speed.

As the name implies, the 351 PC is tailtoned to the IBM PC. You won't have to to worry about setting DIP switches—just plugit in, load the paper, and go, If you do have to get at the switches for some reason, the cones you're most likely to change are rewell located under a cover on the control punel. To get at the remaining DIP switchess, however, you must remove the top half of the case.

The Centronics 351 PC control panel is worth mention because some of the most commonly used features can be accessed directly from the panel. While these features can also be invoked by software commands as they can be with other printers,



Printstation 3St PC Centronics Data Computer Corp I Wall St.

1 Wall St. Hudson, NH 03051 (603) 883-0111 List Price: \$2,195 Dim.: 7.5\*×22.5\*×18.2" Weight: 46 lb. Country: U.S.A.

ROLE READER SERVICE NO

even a printer novice can call them up from the control panel. Double-pass printing for letter quality, for instance, can be switched on or off either from the panel or through the use of software commands. And this is also the case for the cut sheet option. which provides an extra button just for feeding single sheets.

Paper feed is bidirectional-and it is again controllable either from the control panel or software. However, you should take heed that the manual cautions against running paper backward more than a 1/2 inch. While I had no problem when I cheated a little to see what would happen, I would certainly suggest following factory recommendations since the tractor clearly was designed to pull rather than push the

A full range of print enhancements and features are available on the 351 PC in pitches of from 5 to 16.5 cpi, except that 8pitch is available only in data-quality mode. However, underlining, subscripts, superscripts, and almost any of the other features you might expect are here. The near letter-quality mode looked pretty good, even on close examination. I was a little disappointed though by the data quality. Data quality is coarse, and with double-strike it's darker but not significantly

better. The printer comes with two sets of documentation, one for the 351 PC and the other for just the plain 351. Both apply to the same machine; the former, however, addresses use of the printer with the PC and the appropriate settings. While not as slick in appearance as the documentation for some of the more consumer-oriented machines, it does a good job of detailing the various printer functions. It also gives all of the codes to access special features and enhancements in three different formats-escape sequences, BASIC, and hexadecimal-so you can use whichever format you happen to be most comfortable with.

So while the Centronics 351 PC has a lot of nice user features, for the price it came up a little short on performance. It's an interesting machine and should certainly be on your list if you're in the market for a medium-to-neavy-dury office machine. -Jim Forney

#### Epson SQ-2000

Epson has added a new high-speed blackonly ink iet to its line. Although it's a bit pricey, the SO-2000 is the most exciting ink squirter I've seen. The SQ-2000 turns out an extremely good near letter-quality print at close to laser speeds. It is also impressive when printing graphics or ordinary matrix text. And like all ink jet printers, it's whisper quiet.

While a little note packed with each cartridge assures you that ordinary soap and water will clean you up if you wind up wearing some of it, this one proved to be a pussycat. No need to wear a wet suit or even rubber gloves. Just push the cartridge down into its compartment (you can't even put it in backwards), and you're in business. The cartridges even have self-resealing bladders that you can remove and save for another day if you wish, provided they

were properly installed in the first place. While an optional tractor is available to facilitate the use of fanfold forms with the SQ-2000, the one we tested came with a sheet feeder instead. For a printer designed to deliver fast near letter quality. I was disappointed in the single-sheet feeder. While well designed, it is still a single-sheet feeder. You must stand there and feed it one sheet at a time while it stops and waits for you to drop a new sheet in the hopper, push the sheet feed button and then the on-line one before the SQ-2000 can zip through another page of 95+ cps near letter-quality print, only to have to stop and wait before doing the same thing over again. I would prefer to use the optional tractor.

However, the SO-2000 has built-in features that will probably reduce the nuisance that has traditionally gone with ink iets. It has a special cleaning button on the panel that can be activated any time the printer is off-line to purge the iets. And when on, but idle, the printhead automatically dashes over to the left-hand side of the machine to clean its little iets every few minutes

The SQ-2000 also has the miraculous ability to store enough power during normal operation to do its housekeeping chores and park the printhead comfortably against a wick assembly to keep the jets from drying out and clogging when you shut it off. And this is true even if you've pulled the plug or the power is down. But the first time you watch it merrily going about its business as you hold the plug in your hand can be disconcerting.

Along with the sheetfeeder, we received a packet of about 100 sheets of stationery. This is pretty standard since ink jet printers generally give the best quality when used with special coated papers. But I ran the printer with both the special paper supplied by Epson and ordinary fanfold and could see little difference-a definite selling point for the SO-2000

So as ink jets go, the Epson SQ-2000 looks like the pick of the litter if all the special precautions Epson has taken to prevent clogged jets prove effective in the long term. It's fast and quiet, delivering excellent print quality. I even liked the ink delivery system. The SQ-2000 looks like we've finally got an ink squirter that's ready to jet into the future .- Jim Forney



#### FACT FILE

SO-2000 Epson America Inc 2780 Lomita Blvd. Torrance, CA 90505 (213) 539-9174 List Price: \$2,295 Dim.: 6.5" × 24.4" × 15.1" Weight: 36.7 lb. Country: Japan

CIRCLE READER SERVICE NO 642



630 ECS Xerox/Diablo Systems Inc. 901 Page Ave. P.O. Box 5010 Fremont, CA 94537 (415) 498-7000 List Price: \$2,295 Dim.: 9.8" × 23.1" × 19.3" Weight: 60 lb. intry: U.S.A

CIPICLE READER SERVICE NO. 641

#### Xerox/Diablo 630 ECS

The Xerox/Diablo 630 ECS is a direct descendant of the Diablo 630, one of the oldest and best-known daisywheel printers. The original model earned a reputation for quality and reliability that few others have matched, and the 630 ECS does not depart from family tradition: the solid, bulky printer is just as sturdy as it looks.

The 630 ECS is still the same familiar Diablo 630 on the outside, but it sports an additional feature on the inside. It can use an Extended Character Set (ECS) printwheel that can exactly match the character set in your IBM PC.

The ECS printwheel has 2 characters on each of 96 spokes, a total of 192 characters. These can be joined in various combinations of "constructed characters" to create as many as 400 different characters from the single wheel. Compare this to a standard Diablo daisywheel that has between 88 and 96 spokes, with one character located on the tip of each spoke. Diablo sells more than 200 such wheels, and the 630 ECS can use any of them.

For PC users the most obvious application for the ECS wheel is to use the printwheel with the high-order IBM PC characters. When you put the PC graphics wheel on the printer and set the easy-to-reach DIP switches, the 630 ECS prints the PC's high-order characters without any fuss or bother.

The newest version of the 630 ECS offers other kinds of ECS wheels as well. These include two legal/italic wheels, two scientific wheels, two dual-pitch wheels, two Teletex wheels, two multipurpose wheels, one business-graphics wheel, and even one combination English-Arabic wheel for a total of thirteen printwheels.

Print quality with any of these wheels is just what you would expect from the daisywheel printer that helped set the standard for the breed. The Diablo 630 may not have the best print quality available (that of the Oume Sprint 11/90, for example, is better), but its print quality is certainly among the best.

The two biggest drawbacks of the Diablo 630 ECS are its speed and noise. We timed the printer at 37.9 cps, a respectable clip for a daisywheel printer but hardly enough to rate the machine as a speed demon. The noise level, meanwhile, is too high for comfort. I try to leave the room when my own Diablo 630 is running because it reminds me too much of a jackhammer beating away at what remains of

my hearing. Two other pluses of this printer are its

ease of use and documentation. The Diablo 630 command set has become one of the standards that competing printers copy and that most programs take advantage of. This means that setting up a program to work with the 630 ECS is usually as simple as picking the Diablo 630 choice from the program menu. If you want to do more with the printer, however, you'll find that the new documentation has most of the information you will ever need.

One last point: In addition to adding new features to the 630 ECS. Diablo dropped the price \$300-to \$2,295. While still high, this price is somewhat more aggressive and makes the 630 ECS more attractive. The 630 ECS may not be the ultimate daisywheel printer of your dreams, but remember: It's the only one out there that prints the entire PC character set. Maybe it will do until something better comes along .- M. David Stone

#### Genicom 3320 Quiet

When magazine deadlines conflict with the scheduled production of a printer, we must occasionally review a machine not ouite in final form. Although the Genicom 3320 Quiet dot matrix printer is supposed to eventually have IBM Graphics printer and Diablo compatibility, the unit we evaluated implemented only the dreaded ANSI X3.64 control sequences.

I have little doubt that the final Genicom 3320 Quiet model will succeed at being IBM compatible, since some of Geni-



3320 Quiet Genicom Corp One General Electric De Waynesboro, VA 22980 (703) 949-1000 List Price: \$2,395 Dim.: 7.3"×26"×19" Weight: 38.6 lb

CIRCLE READER SERVICE NO. 640



## Snap.

PaperPro.™ The first super lightweight sheet feeder with heavyweight performance. Ultra-compact PaperPro pops on your letter quality/matrix printer in mere seconds. All for an amazingly agreeable price. Absolutely no controls, switches, adjustments or special software are required.

## Crackle.

Paper Pro is a cinch to load. Fan the stack, then slide it (up to 80 sheets) into the tray. With its bull-in automatic feed mechanism, Paper Pro inserts single sheets to the first line position. Everytime. No cables, electrical connections or preloaded paper cassettes are needed. You can even turn your printer off—without disturbing the positioning of the paper.





## Print.

PaperTrue gets the job done. Fast. Think about using Lots 12-3.7 Symphom," etc., with PaperTru to get automatic insertion of cut sheets. In mere minuter that lengthy spreadsheet report will be ready. Or that direct mail letter to your customers and prospects. Depending upon printer design you can print on the entire pagin in vertical or horizontal store or dealer near you. Or call 214/343-3155 for information. Rutishauser of America, Inc., 10345 Brockwood Rd., Dullas Tr. 75238.



com's previous models emulated the similar Epson MX series. The IBM highorder character set is also promised, although the unit we looked at duplicated just the normal ASCII characters for the extended ASCII codes.

This American-made printer from Genicom, formerly a division of General Electric, will be marketed with an emphasis on speed, advertised as delivering 300 cps in data processing mode and 180 cps in near letter quality. We clocked 144 and 91 cps, respectively, certainly not the fastest we've seen but clearly above average.

we've seen dut clearly above kereage.

Both the draft quality and the data processing. The text from this printer looks
provided by another than the printer looks
provided by another. All output he Creating
to solve the control of the control o

The Genicom 3320 Quiet is big and stardy with loss of heavy steel and innards that proclaim American construction. The tractor feed has an unusual design in which the tractor is on the bottom of the case and pulls paper through the back. Pinch rollers carry it past the printhead. Although the design looked like it might be subject to problems, paper feeding was fast and trouble free.

I liked the extensive menu selection of features from the front panel. And choosing one couldn't be simpler. Push the PRG button, and a menu is printed out, listing by number the items that may be changed. Press one of these numbers, and the alternatives are printed. Press the number of the one you want, and the initial menu is updated and printed. Press 0 and you're out of roveram mode.

Left and right margins on the Genicom 320 Quiet can be selected by moving the printhead back and forth between buttons abselded with arrows on the frost panel and then pressing LM SET or RM SET. This provides a good visual indication of the margins without requiring actual measurements. It's almost like using a mouse! All selections from the front panel survive printer resets and power-off.

Another plus is that the Genicom 3320

Quiet is quiet, just like the name says. Considering that the sound is much louder when the cover is up, the cover design must be largely responsible for cutting down the noise.

I hope Genicom improves the character fonts before they issue a final 3320 Quiet production model that supports the IBM extended character set and control sequences. At \$22,395, American power and speed by themselves do not make it.

—Charles Petzold

#### Okidata Pacemark 2410

The new Okidata Pacemark 2410 is my kind of printer massive, fast, clean, and retainvely quite. Now, by popular request, it's available with IBM-compatible control codes and graphics. Since Okidata did not find it practical to develop a "Plug "Plug" kif for the 2410—as it did for compatibility required completely redesigning the main control circuit board. And the results are superb!

Our tests showed that the new Oki was a good 10 characters per second faster than its predecessor, but the folks at Okidata seemed surprised at that and assured me that it's mechanically the same machine. Could be, but the new electronics seem to process the data faster. Same machine or not, it's clearly built todo a serious, heavyduty job day in and day out.

Fast but not stupid, the Oki even has a sensor on the printhead carriage that pre-

vents it from printing past the edge of the paper no matter what your software tries to make it do.

T've hefted a number of heavy—and heavy-duty—machines. Too many of them can claim only a couple of extra features to justify their extra pounds. All too often, the features aren't worth the extra hassle. Not so with the new improved 2410. It had ne cackling like an old hen and repeating tests for the fun of watching it zip through them so effortless.

The 2410's print quality can't match that of printers with hear of printers with he new 24-pin printeheads, but it's still good enough to make me question the need for a formed-character machine. And it gives that quality at 50 cps in near letter-quality mode and more than 200 cps in draft mode. The 2410's data mode is even faster, and the print quality isn't all that bad.

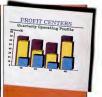
And yet the Okidata 2410's speed isn't intimidating, like that of many printer speedsters whose forms tractors grab paper so violently and sometimes jam so spectacularly. It's a confortable speed, sort of like settling back to a smooth 500 miles per hour on a jet after racing to the airport at a nerve shattering 35 miles per hour in rush hour traffic.

Unfortunately, the documentation I received with the 2410 was seriously in error in some respects. It had the wrong software codes for calling up the letter quality, draft, and data modes. Worse, two calls to Okidata's technical support staff failed to shed any light on why some of the published access codes wouldn't work on some machines. The other codes seemed to work just fine.



# natcan minutes?





you've ever made using slides, video or paper. With VideoShow,™ the only complete hardware and software presentation graphics system, you can:

- Create professional-quality charts and graphs yourself on any IBM® PC compatible, even if you've never before used a computer or made your own graphics.
- Use 1000 colors to brighten your images...hundreds of colors more than any other PC-based system.

monitor or a video projector. VideoShow's quality and resolution are more than five times better than any PC graphics product available.

- Add slides, overheads or paper copy in 1000 colors and professionalquality resolution.
- Change the information in any picture as often as you like in minutes at no extra cost.
- Interfaces with all popular software packages. VideoShow at \$3,499 costs less than one professional slide show.

Find out how to use your PC and VideoShow to make your best presentations in minutes for pennies by calling 1-800-556-1234, Ext. 234. In Calif., call 1-800-441-2345, Ext. 234.

from General Parametrics, Berkeley, CA

CIRCLE 177 ON READER SERVICE CARD

Lotus and 1-2-3 are registered trade



3310 Color Genicom Corp. One General Electric Dr. Waynesbero, VA 22980 (703) 949-1000 List Price: \$2,450 Dim.: 6.3" × 25" × 16.1" Weight: 33.1 lb. Country: U.S.A.

ODO F DEVOCUERDADO

It took a tantrum that registered about 40 on the Richter scale to get a callback from someone who knew about the problem. He recited a litany of codes that worked. By that time I'd already hacked my way in and figured out the problems to the But Okidata should get its act longether and let its technical support people in on the problems it already knows about

Still, I do like the new 2410. I love the performance, and the price is fair given what it does. I just wish Okidata would back it up with the kind of support the average user needs.—Jim Forney

#### Genicom 3310 Color

Genicom's 3310 Color dot matrix printer not only does color but can print out data at a measured 150 cps. It can also shift into a nicer looking Courier font—Genicom calls it letter quality—and move along at about 96 cps. (I wouldn't call it letter quality, but it sure is speedy.)

When I first opened up the 3310 Color to load paper, I found a reply card inserted into one of the tractors. It said who had run the final tests and final inspection on that machine and asked for my opinion on the appearance of the machine, out-of-box performance, and any comments I might care to make. I thought that was a nice touch.

Built on the same basic frame as its cousin the 200-cps 3410 (see the next review), the 3310's print mechanism almost loafs along by comparison, even in the

data mode. Paper loads through the rear, entering near the bottom and passing either through a genuine tractor assembly (not pinwheels) or friction rollers that retract out of the way when you are using fanfold forms. The printer has a fixed metal print platen, and after the paper (either fanfold or roll) passes the platen, it goes on through a set of friction rollers before finally exiting the machine.

I liked that upper set of friction rollers because it means that the paper is being gently pulled, not pushed, through the machine. This makes it nearly improof.

Color capability is probably the main attraction of the 3310 Color model, and there is some good news and some band news here. The good news is the color per inch, and the color ribbon it uses has a large surface area, which should translate to good ribbon life, while retaining superiroctory quality. The 3310 printhead also changes ribbon colors very quickly, which is especially important when printing graphics. The machine is espaide of mixtal the printing and the same life, and it also prints hor codes.

The bad news is that the 3310 is not IBM or Epson graphics compatible. This means that to do graphics, you're probably going to have to do your own programing. Also, while you supposedly can mix colors on the 3310, the one I tested wouldn't mix them because it had only four color control codes, one for each of the colors on the four-color this four-colors on the four-color this program of the colors on the four-color this program of the colors on the four-color this program of the colors on the four-color this colors on the four-color thinks of the four-color

Genicom has its own special language of control codes for communicating with its printers. The codes you can use, how-

ever, vary depending on which font you're using. I found significant errors in the documentation for some of the codes. By the time I got to the 3310 Color printer, I understood and could correct the problem, but I still found it annoying.

The 3310 Color printer I tested came with four fonts installed: draft, ORCA, ORCB, and Courier LQ. The quality of the first three was quite good. I was disappointed, however, by the so-called letter quality font. It was downright ragged-looking and inferior to the letter quality output of even the cheapest machines.

A sturdy, well-built machine, the 3310 Color is clearly a trade-off with its fast data processing twin, the 3410. It has trad-ed speed for color, but its lack of graphics compatibility with off-the-shelf software leaves it poorly supported. For my money it's not fast enough for real data processing, certainly below par for letter quality, and of only magnial interest as a color printer because of its lack of compatible graphics.—Jim Forney

#### Genicom 3410

Super-fast dot matrix data printout on wide forms (to 136 characters wide) is what the Genicom 3410 is all about. This printer has very little in the way of frills and makes no bones about not being letter quality (albough a Courier LQ front is available). What the Genicom does, and does really well, is spend all day by a computer spitting out data at about 220 cps. Let's face it, someone has to do the dirty work.

Paper, whether it is fairfield or roll paper, is feld trough a low slot on the berper; is feld trough a low slot on the both of the printer, and then it goes through either a gusher tractor of refiction rollers, past a fried platen, and then through a set of fireally a supposed of the printer of the set of the it's locked in the lower tractor (or rollers), loading is supposedly automatic. To play it is chower, I found it best to advance the paper with the manual roller until it was sately past the platen and sung into the upper rollers. This method cannot complicate the paper of the paper feed on the 3410.



## OPEN AND SHUT CASE.



Holmes, it's criminal-these "sloppy disks" all over the desk! How can we keep them secure and dust-free and still have access

to the active ones?

Mystery solved, Watson, This new 50+4 Locking Disk File provides a locking, smoked plastic enclosure for up to 50 514" diskettes, plus an open, up-front, instant access, swap-rack for 4 diskettes. Let me call your attention to the built-in handle, and the adjustable dividers with adhesive labels. Note the rear storage pocket for extra labels.

By Jove, Holmes, open and shut simultaneously! It's perfect for those powerful integrated, multi-disks systems-and no one's thought of it before! Holmes, you never cease to amaze me.

Elementary, my dear Watson,











#### PP FAGT FILE

Genicom Corp.
One General Electric Dr.
Waynesboro, VA 22980
(703) 949-1000
List Price: \$2,450
Dim.; 6.1" × 25" × 16.1"
Weight: 33.1 lb.
Country: U.S.A.

CIRCLE READER CARDING

The 3410 uses an unusual ribbon cartridge that adjusts for wide or narrow carriages. The cartridge has a built-in reinking feature to extend its useful life. The manual suggests that reinking may be necessary after one to two hours of continuous printing, or up to a million and a half characters. It's also suitable for some 80-character-per-line machines because the whole cartridge stretches out from about 8 to 131/s inches.

The 34101 tested had only draft quality and two computer fronts installed, ORCA and ORCB. And if you don't want to get involved with escape codes, you can call up fonts and most other programmable functions using the buttons on the control panel. Just make sure the printer is off line and set in programming mode.

Speaking of codes, Genicom has a set of escape sequences that are both unique and unpredictable. For instance, the manual gives commands for print enhancements, changing fonts, and several other potions that I was unable to make work. I called Genicom and was told that, while typical, the codes in the manual were not necessarily the actual codes used in the printer.

points. Company representative told me that to determine what codes would work. I had to print out a printer status sheet from which I could determine the actual codes for the various fonts costalied. Each four has a single-digit number and by putting a I in front of that digit and then sundwiching that two-digit number in the tweether single that two-digit number in between Esicl and m I would have the proper call-up code.

Similarly, I was told, to find out the

correct codes for enhancements, I would have to have the printer print a listing for each font installed in it since the available enhancements varied from font to font. Those would also have numbers listed with them, and these numbers sandwiched between Esc[ and m would call up any enhancements—no extra digit required.

To make a long and confusing story short and simple, adding a digit and making an escape "sandwish" worked fine for calling up fonts. Making up my own enhancement sandwish from the printer status sheet didn't work, however. This I found particularly ironic because the sample codes in the manual that weren't supposed to work did.

The Genicom 3410 is a high-speed data machine that makes no apologies for its poor print quality, homely appearance, and other shortcomings. It does churn out data at an incredibly productive 200 cps, however. So, if you want a real work horse, turn on a 3410 and watch the paper fly.—Jim Forney

#### Qume Sprint 11/90 PLUS

Qume is known for making solid, dependable, daisynohecl printers, and the Sprint 11/90 PLUS is no exception. The Qume Sprint 11/90 PLUS has the same low-pro-file design as its prodecessor, the Qume Sprint 11/95 and so it almost thut not quite) manages to look less bulky than most full-size disalywheel printers. It also has mostly the same features as the Sprint 11/55.

As the name implies, the Sprint 11/90 PLUS uses the Sprint 11 control codes; the 90 refers to a claimed print speed of 90 cps. As usual, its claimed speed is a bit optimistic for the PC Magazine speed tests, but the printer, still manages 62.8 cps—for a daisywheel printer that's speeding along in rare company.

Print quality is not an issue with the Sprint 11/90 PLUS. As a daisywheel printer, it produces true Selectric-quality output almost by definition. Of course, some daisywheel printers do better than others, and the Sprint 11/90 PLUS is among the best.

On the minus side, daisywheel printers tend to be noisy, and the Sprint 11/90 PLUS rates as one of the noisiest I've heard. Unless you enjoy the sound of a jackhammer pounding next to your ear, you'd probably prefer being in another room when this printer does its stuff.

For the most part, the Sprint 11/90
PLUS is easy to use. The manual is clear
and well illustrated. My only problem was
finding the printer control codes, which

#### PA FACT FILE Sprint 11/90 PLUS Qume Corp.

Qume Corp. 2350 Qume Dr San Jose, CA 95131 (800) 223-2479 List Price: \$2,500 Dim.: 7.2" × 24.5" × 14.8" Weight: 37 lb. Country: U.S.A.

ORICLE READER SERVICE NO. 636



## Buy A Local Area Network For Less Than \$100 Per PC

STOP buying expensive duplicate PC peripherals Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a

day? Even your expensive hard disk is used infrequen The obvious solution to avoid expensive duplicate peripherals is a local area network that

allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

#### INTRODUCING THE EasyLAN" OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. EasyLAN can save you \$1000 or more per PC by eliminating duplicate equipment purchases. EqsyLAN advantages:

- EasyLAN shares printers, disk drives, and information
- # Easy to justify-less than \$100 per PC
- Easy to install
- Easy to operate
- Easy to order
- RasuLAN performs in the background EasyLAN's low price matches the small

husiness user's cost sensitive hudget It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW. and the RENEFITS ARE HIGH.

EasyLAN performs its operations concurrently in the background. EasyLAN communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS apolications as Lotus 1-2-3." WordStar" and dBASE." EASY TO OPERATE

EusyLAN network software allows PC users to share printer and disk peripherals. PCs are connected by EasyLAN cables plugged directly into your PC's standard serial communication ports and EusyLAN

EasyLAN's performance meets your sm EASY SPECIFICATIONS office requirements to move word processing

documents and spread sheets between PCs. For example, EasyLAN can move a 10 page document. between two PCs, as a background operation, in less than one minutel Regul AN loads automatically at boot time

It manages the PC's serial and parallel ports for



of the EasyLAN software, 128k of memory, a serial communication port(s), and DOS 2.0 or above. Por your convenience. Easy/AN diskettes are not core protected. EasyLAN runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.





#### EasuLAN Office Network

es and printing, All Eury LAN

nerations may be started from any connected PC. Printer sharing operates transparently with existing programs. Print files are automatically written

to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks. For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with

Printer 3 for printing continuous-form invoices. Disk sharing uses BaryLAN's COPY comm EZCOPY," to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard

disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security

#### EASY TO INSTALL Earn/LAN can be installed in less time than it takes to

enion your coffee break. Just plus the EasyLAN cables into existing serial ports. EasyLAN's PRINT, COPY and DIRECTORY commands are very similar to DOS

EASY TO ORDER EasyLAN is immediately available and easy to order.

For a two PC network, start with the EasyLAN Kit. For each additional PC in the network, order the EasyLAN Expansion Kit. The EasyLAN Kits include program diskettes,

suals and cables, which are shielded to maintain signal quality. All parts are warranteed for one year. EasyLAN program diskettes may be purchased individually; you supply your own cables, modern links

tall be used with alguar I take bringszer supported	is manufactive.	of I has continued in		
geographically separated PCs using modems and dial-up lines.	ORDER EasyLAV TODAY	1-800-835-1515 Server	Technology, Surosyvale, CA 94005	406/738-8377
		EaspLAN Order Porm	907	Assessed
iane hipping Addrens		BargLAN Kit.—for 2-PCs: One 30' Cable, Two Dinketten, and Manuals.	Price \$179.96	
Ny		BarylAN Expansion Kt.—for each One 30' Cable, Diskette and Manu		
Itale Zip		BargiLAV Diskette and Mazoni.	Price \$ 79.86	1
rayment: USA-Visa, MC, Check, PO No COD		BurgLAN Cable—30'	Price \$ 49.96	
Out of USA—US \$ Bank Draft		Custom length cables. Call for quo	6e. CA resident tax 7%	4
lune on Credit Card			Shipping Charge: USA \$5.00 Out of USA \$15.00	1
Card Expire Date		TOTAL ORDER		1
For Ordering or Configuration Help Call	l Toli Pree		1006 E. Duane, 8107	end ANI

In California call 408/738-8377 MasterCard and Visa Accepted 406/738-8077

are listed in a separate manual that comes with the printer's inserface module. The interface module is usually shipped separately from the printer. Unfortunately, the carried from the printer. Unfortunately, the came with the interface annual. When I called Qunne, they immediately apoliced and promised to send out the manual and a quick list of the command codes that I needed to run the tests. Based on my experience, I would say Qunne gives helpful, and coursons apport to its customers, and coursons apport to its customers.

Despite its noise problem, the Sprint II/90 PLUS has to rate as one of the better buys in fully formed character printers. In view of its speed, the \$2,500 price tags, and the workhorse reputation of Qume printers, you can probably live with the noise. If not, you can always hook up a long cable and put the printer in another room. If you're looking for a fully formed character printer, put the Sprint II/90 PLUS high on your list.—M. David Stone

#### Hermes 615 Professional Color Printer

The high-speed, letter quality text the Hermes 615 delives in eight colors is good enough to grab anyone's attention. But the eyes really bulge when yoo have all that in a heavy-duty, wide-carriage, dot matrix printer with a double-sided bidirectional push-pull tractor. This buby is built for the long haul. It does graphics too, but unfortunately the model I tested is not fully IBM PC compatible in that mode.

The tractor is one attention-getting feature of the Hermes (15—milke most fanfold feed devices, it's doubtle sided and has a positive grip on the paper both before and after it reaches the printing platen. This allows the (15 to pull the paper through regardless of whether the form is feeding forward or in reverse, rather than pulling in one direction and pushing the other way as is the case with most fractors.

While not too many applications require reverse paper feeds, it is a very nice



feature for any that do and makes the 615 much less prone to paper jams in those situations. For ordinary applications you don't have to use the lower tractor if you

don't want to.

The 615's four-color process ribbon is a strange cross between a cartridge and a spool. It comes in a cartridge, but to load it into the printer you have to pull a couple of feet of loose ribbon out and thread it by and. Cartridges come with a plastic glove to wear while changing the ribbon, but altogether I found the job surprisingly neat.

At an honest 95.92 cps for leier quality, this machine 'pair pith along, list noise level, however, is lower than that of comparably fast machines. A rigidally mounted 18-pin printhead lays down a dot pattern hard to distinguish from fully formed characters. In the letter quality mode, sert can be emphasized or underlined and printed in your choice of eight colors. Other enably and the printed in your choice of eight colors. Other enably and the printed in your choice of eight colors. Other enably and the printed in your choice of eight colors, the print however, are available or print, however, are available to handing a DIP switch.

It looks like the Hermes 615 should do a bane-up job on graphics too; unfortunately it was designed for a protocol that isn't entirely IBM compatible. You can graound this problem with various third-party software packages. (Note: Hermes introduced the PC-4, a printer comparable to the 615 but tailored to IBM graphics specifications, too late for review in this is-

sue.)

Documentation for the Hermes, while adequate, was clearly written by technical people for technical people. I could easily envision some poor novice user totally in-

timidated by command instructions that more user-friendly manuals make easy even for the uninitiated.

I found access to the DIP switches through a small round hole in the bottom of the case quite difficult—I even managed to knock the retainer clips for the printer ca-

ble off in the process of turning the 48pound machine over to get at them. In spite of these few annoyances, I was impressed by the Hermes 615. If the new PC-4 lives up to its PC-compatible promise, Hermes will have an awesome contender in the heavy-duy. Out of matrix

printer market.—Jim Forney

#### Qume Sprint 11 PLUS Widetrack

The perfect statistics—Balety to warm the beart of many an accountant—may belong to Qume's Sprint II PLUS Widerack drainwheel prints; which boasts an impressive 38, 21, and 32.5. The 38 is the measured letter quality character per-second print speed. The 21—for all you spread, which was the property of the prints and the prints are perfectly of the perfect of the

In fact, the key feature of this new Sprint is that it is a wide machine. The number of spreadsheet columns you could print with a 15-pitch wheel installed boggles the mind. And with this machine's



## A disturbance here could put your computer out of business.

The slightest variation in your power line can destroy a lot of invaluable data, a-long with a lot of valuable hardware. Whicis why we invented the Power Director?

Instead of plugging your computer and components into the wall, plug them into the Pow-

er Director. Now your system is protected. Because the Power Director can safely handle anything an electrical storm or your local power plant can put out, up to 6,000 volts. And you have UL's word on that.

line can destroy a lot of invaluable data, along with a lot of valuable hardware. Which

You spend thousands on a computer system. So do like 100,000 computer owners are

doing. Protect your investment with a Power

vestment with a Power Director. It's a perfect fit with any computer. For the Computer Accessories dealer

nearest you call 1(800)582-0852 in CA Or 1(800) 582-2580 outside CA. You'll be surprised how much better your computer works without interruptions. COMPUTER ACCESSORIES

We support the system.



#### PO FACT FILE

Sprint 11 PLUS Widetrack Qume Corp. 2350 Qume Drive San Jose, CA 95131 (800) 223-2479 List Price: \$2,990 Dim::7.3" × 32.5" × 14.7" Weight: 39 lb. Country: Puerto Rico

CIRCLE READER SERVICE NO 634

print speed, it wouldn't take all day, either. It has standard print enhancements like bold, shadow, and underlining, so you can make selected entries stand out clearly even in the most complex spreadsheet.

And yet the Sprint 11 PLUS Widetrack isn't as large as you might expect. Except for the width to accommodate that long carriage, it's quite compact: Its depth is not) 14.7 inches and its height, 7.3 inches. It is, in fact, styled to fit into an office environment unobtrusively—not like those big, high-speed data processing monsters that take a forklift truck to move.

Paper feed is by means of a friction plate in that can accept an original and up to three copies for a total form thickness of up to 0.023 inches. You can use the 16 switch-selectable form lengths, or program your own. However, I was susprised upon the control of the control

The printer's control panel couldn't be much simpler: two membrane push buttons and two indicator lights. The two membrane push buttons consist of a "pause" button that puts you on- or off-line, and a form-feed button. There's no line-feed button, however, and I missed having that. The two indicators are "at-tend" and "ready," although ready doesn't mean ready if it's only blinking. I'd be happier with a little less simplicity.

The Sprint 11 PLUS Widetrack reviewed here came equipped with an interface for the IBM PC. However, the interfaces are interchangeable by the user, and this printer can be used with interfaces that

match a wide variety of computers. The Qume Sprint II PLUS Widetrack printer is not compatible with normal (dot matrix) PC graphics, but it does support graphics printing either 60 or 120 graphic points per inch horizontally and 48 points per inch vertically. However, you must either write your own software or find a compatible third-party software package that supports these graphics.

Although this is a single-purpose printer—unbeatable for spreadsheets or anything else that requires wide paper—I had been hoping its other features would be better overall. Because of its high price, the simplistic controls and the necessity to buy a tractor and sheet feoder as options are a disappointment. Nonentheless, if s a solid machine from a rock-solid company, 21 inches is unique in the industry. So if this int love, if II just have to do. —Jun Forner

#### BDS Laser 630/8

Setting up and using a laser printer like the BDS Laser 630% put syou in a whole different world from that of the Epsons and Jukis. You've got paper trays, electrophotographic cartridges, drums, LED disavs, and obscure control panels to deal

You might shake your head and ask,

What is this, a printer or a photocopier? The answer is, a little of both.

A laser printer is basically a dot matrix copying machine. Printed pages from the BDS Laser 5308 have the look of a well-made photocopy. The secret is the 300 dots to the inch, a ratio much higher than that used by conventional dot matrix printers. Still, if you really look closely, you can see all those little dots.

The hurdest part of setting up the Laser 5030 is getting it out of the box and onto a desk. It weighs a hefty 60 pounds. The rest of the procedure takes about a half-hour. Learning to work the control panel takes the most time; it's very confusing. For example, the LED display blinks incessanly, just for the sake of blinking, its blinking doesn't indicate that anything is wrong, but found it distracting anyways.

Speed, flexibility, and the near absence of noise are the hallmarks of laser printers. The BDS Laser 630% is no different. It is quiet, with just the sound of the fan and some soft whirring.

More good news is that the BDS Laser 630% sext features are generally Diablo 630 compatible. Setting up your word processor is thus easier. The Laser 630% escape sequences evident from the Diablo escape sequences evident from the Diablo for example, look the same, and the Diablo escape sequence to use red ribbon makes itakies on the BDS. The only print features available on the BDS Laser 630% are combinations of pica and elite type, boddings, italic, and continuous underlimated to the process of the second of the second print of the process of the second print of the process of the second print of the print o

The bad news for the current edition of the 630% is that the continuous underlining is a mess. Spaces are underlined differently than characters are, so that the underline dips down between words. The result is so unsightly you will probably forgo continuous underlinine.

BDS claims that font cartridges, downloadable fonts, and proportional spacing will soon be available.

Laser print speed is difficult to measure, and the BDS 630/8 is no exception. Speed is measured by pages per minute because laser printers print at the same speed regardless of what's on the page. The BDS Laser 630/8 claims a speed of 8.1 pages



#### FACT FILE

Laser 630 8 BDS Corn 800 Maude Ave. Mountain View, CA 94043 (415) 964-2115 List Price: \$3,495 Dim.: 11.4" × 18.7" × 16.3"

per minute for II-inch paper, and that's true enough when long continuous documents are printed-the pages slide out every 71/2 seconds. A normal single-spaced page has about 3,000 characters, and so conceivably the speed of the printer could reach 400 cps.

For shorter or less dense documents the effective speed is much lower. Even when warmed up, it took almost 40 seconds to print the first page of a document. Our standard print speed test involved a pageand-a-half letter of about 3,500 characters. Because of the long wait for the first page, the effective speed was only 75 cps.

You can depend on the high speed of this laser printer only for long documents. If most of what you print is one- to threepage memos or letters, waiting for the 630/8 printer will be frustrating.

At maximum speed a 500-page manuscript can be printed in a little over an hour, but don't think you can hop out to lunch during that time; the input paper tray holds only 100 sheets, and you have to refill it every 12 minutes. In addition, you have to empty the output tray after every 20 to 25 pages or every 3 minutes. And lest you think you'll have any free time, don't forget you'll have to reverse the order of the printed pages to assemble your document. as with most copy machines.

I have an "It's okay, but . . . " reaction to this printer. During last year's printer survey the Hewlett-Packard LaserJet generated some real excitement, even with its \$3,495 price tag. For the same price this year, BDS offers a similar printer with easier-to-use (Diablo) command sequences but with fewer features and an inferiorwork? Is it safe? Is it legal? Why would anyone want to do such a thing?

Relax. Your PC doesn't have to speak AppleTalk to use the LaserWriter. Nor do you need a mouse. You can run the LaserWriter from a PC serial port; it understands a healthy chunk of Diablo control sequences.

While the results in Diablo mode look very nice, a Diablo-compatible printer isn't worth nearly \$7,000 unless it gives you stunning typeset-quality variable-size proportional fonts-the same ones that allow the Macintosh to print some amazing things on this machine. And the Apple LaserWriter does: using PostScript, a printer programming language developed by Adobe Systems, the LaserWriter can give you some of the best-looking Times Roman and Helvetica fonts you've ever seen from a laser printer or any other computer printer.

Unfortunately, only one PC word proer dots, approach the quality of the fully cessing package supports PostScript: Miformed characters. They also surpass dot crosoft Word Version 2.0. Adobe is curmatrix printers in speed. But I'm not quite rently working with a number of software ready for one yet. There are a few too houses for IBM PC support of PostScript; many annoyances to be ironed out. I think so other word processing and graphics I'll keep my dot matrix printer until the nackages may eventually be able to wring prices (and the dot sizes) on the lasers the power out of this machine.

The LaserWriter has the same basic Canon engine that forms the foundation of most laser printers. Specifications are also similar: 300 dots per inch, eight pages printed per minute. The Apple difference is the electronics. The LaserWriter has a 12-MHz 68000, V-MHz ROM, and 1V-MHz RAM (in nontechnical terms, that translates to "awesome"). The ROM has

Weight: 60 lb. Country: U.S.A.

quality font (its only one) installed. Even with the Diablo codes, its features are so limited that they inhibit the usability of the

printer. Doesn't it seem preposterous to

spend \$3,495 for a printer and not be able

the dot matrix printer and, with their small-

Laser printers retain the flexibility of

to do double-width printing?

#### come down.-Charles Petzold Apple LaserWriter

Does the idea of connecting an Apple LaserWriter printer to your IBM PC make you tense? Do you immediately ask, will it 14 built-in fonts, which range in size from



#### Laser Writer Apple Computer, in 20525 Mariana Ave. Cupertino, CA 95014 (408) 996-1010

List Price: \$6,995 Dim.: 11.5"×18.5"×16.2" Weight: 77 lb. Country: U.S.A.

CIRCLE READER SERVICE NO. 63



A SLEEK NEW STRATECY FOR



nearly illegibly small to page size.

LaserWriter offers four modes: Apple-Talk (which dosn't concern PC users), Special (Diablo 630 compatible), 1200 baud, and 9600 baud. For most uses, like printing screens or a report from your database manager, you'll have to stick with the Diablo-compatible mode because it is the only one that gives you normal printing from the PC.

The 1200 and 9600-baud modes require PostScript and thus Microsoft Word 2.0. The LaserWriter typeFaces available from Word include a standard Courier (in Ib., 12-, and 12-point type), and a proportional Times Roman (8-, 10-, and 12-point type), and a proportional yetherica (12-, 18-, and 24-point type), optionally printed in boldface and/or failsics. This is not nearly the full range of type available when running the Laser-Writer from the Mac, but it's

a suitably versatile subset.

The Laser Writer manual doesn't include much information on connecting this printer to something other than a Mac or about using Diablo control sequences of PostSeript commands. Manuals for the Macintook family are brief and easy to use—if you're a Mac user. To find out use—if you're a Mac user. To find out how really to run this machine and use PostSeript, you have to buy Apple's Inside the Laser Writer manual for \$75.

Apple could easily sell LaserWriters to PC uners if it would supply sufficient documentation for software houses and other people to develop IBM PC applications that support this printer. Meanwhile, if you're an IBM PC user, the Apple LaserWriter is worth the money only if you're not IBM proofs Word to show for you've got Microsoft Word to show or you've got Microsoft Word to show or you have the printer of the water. Otherwise, it 's just a very expensive Diablo-compatible laser printer.—Charles Petzold

#### Quality Micro Systems Lasergrafix 800

The Lasergrafix 800 printer from Quality Micro Systems, Inc. (QMS) clearly demonstrates the potential of laser printing. But it also suffers from some of the grow-



#### Lawrence SOO

Quality Micro Systems, Inc P.O. Box 81250 Mobile, Al. 36689 (205) 633-4300 List Price: \$7,995 Dim.: 16"x18.7"x21" Weight: 92 lb. Country: U.S.A.

\_\_\_\_\_

ing pains that go with this powerful new technology.

Its print quality was outstanding on all its fonts. Some of the characters even had cute little curticues too—frills an ordinary printer would never be able to produce. The printer's secret is an effective resolution of 300 dots per inch. Under magnification you can see the dots, but the naked eye has to strain to see that these aren't fully formed characters.

While the fonts are beautiful, once you've seen upper—and lowercase you've perty much seen it all. Each fout and each size requires the addition of another however, can be freely intermixed within a document. You simply insert the proper codes into the text file wherever you want anapse. QMS offers no condensed or expanded modes, and the company is still working on underthing, emphasized, ensuring the control of the contro

If you can't modify the characters, you can at least rotate them or turn them upside down. And oversized nonfont, blocklike letters can be called up in programmable sizes. The Lasergrafix also comes equipped for easy graphics if you can program in BASIC or another language to access the printer's QUIC programming lam-

guage.

I would not call the Lasergrafix a particularly user-friendly machine. It uses unique and complex printer codes to access its various fonts and formatting features. They're not difficult to learn once you get the hane of it. however.

The QMS Lasergrafix 800 has one print speed: fast. The speed test program ran at

115.1 cps in 10 pitch. It also only has one print quality: excellent. The machine's speed is even higher at tighter pitches, because, like a copier, laser printers do a page every so many seconds, no matter how much you cram on a page.

The machine's problems involved service and support. The printer I tested arrived with the left margin set wrong. QMS's technical support team could only confirm that the problem was in the setting of a DIP switch.

Learning just this took two calls. On the first call, after being put on hold for a few minutes, a woman with a nice Alabama accent insisted on taking down all of the information about my problem, entering it in ber computer, and assigning my call a "job number," which she dutifully relayed to me. She then told me that the man I had to speak to was out to lunch and would have to call me back.

Unfortunately, when he called, he could not even suggest what switch settings to try. It seems that no two Lasergrafix printers are exactly alike, and the correct combination (out of 256 possibilities) can only be determined by trial and error. These problems aside, laser printing is

These problems aside, laser printing is bere to stay. The laser's real beauty would seem to lie in applications that require printing large documents and multiple copies—where second sper page, not characters per second would be the real measure of worth. If you've got such an application, QMS would just love to show you what its Lasergraftx 800 can do for you.—Jim Formey

# PRINTOUTS THA

Take a close look at Canon's line of printers. The first thing you'll notice is how good they make you look. That's because Canon's experience in high tech optics really shows. For instance, Canon was among the first to make a desktop Laser Deam Printer. A sprice that's within any business's reach, the Canon Laser Printer can produce eight pages a minute with a quality that's more in common with a professional print shop than a personal computer.

Canon also developed the ingenious Bubble-Jet Printer technology, finally making it possible for a printer to not only work extremely quickly but also incredibly quietly.

printer to not only work extremely quickly but also incredibly quetly.

Our Inkule Printer can produce exceptionally sharp, high-resolution graphics in seven colors, even on transparencies. While the Thermal Transfer Printer has three kinds of print modes, including letter quality, at a very competitive price.

And the Canon Impact Matrix Series, for regular and extra-wide column paper, makes printing very fast, very economical.













INK-JET

IMPACT MATRIX

		PRI	NTER GUI	DE			
MANUFACTURER: M	ODEL	TYPE, CARRIAGE WIDTH, PRICE	SPEED: Characters per second	TYPE PITCHES: Characters per inch	FEATURES: Printing Formatting	SOUNO LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
Alphacon	Alphate. Asics. Double Strike Default. Emphas e. Elite. Fower	Matrix Impact 10.0 \$249	130 rated 63.9 default 29.8 quality	5.0 10.0 6.0 12.0 8.0 16.0	HVUS PLHFLHT	N/A 78	0 0
Okidata:	Okimate 20: Po e quality. Power quality. Power ality. Power Or	Color Matrix Therm, Trans. 10.0 \$268	80 rated 26.3 default 19.5 quality	\$.0 10.0 8.0 12.0 8.5 17.0	HCUSR LH FL HT	N/A 69	<b>?</b>
Juki: Mod Qm	Juki 6000: Powold print (dout d face). Power print (double s	Fully Formed 11.5 \$295	10 rated 9.7 default 4.9 quality	8.0 12.0 10.0	HVUS	60 71	0
Okidata:	Microline 182 (Std.)  Okidata Microl. hanced print. E ault. Enhanced r On Default. E	Matrix Impact 9.5 \$299	120 rated 82.2 default 60.6 quality	5.0 10.0 8.0 12.0 8.5 17.1	HVUS LHFL HT VT	58 80	<b>?</b>
	Microline [82 (IBM) Okidata 182: Fode. Enhanced Note. Emphasized Elde. Power On De	Matrix Impact 9.5 \$299	120 rated 82.2 default 57.6 quality	5.0 10.0 6.0 12.0 8.5 17.1	HVUS LH FL HT VT	58 77	0 0
C. Itoh: P	Citch Prowriter Letter Quality. ike Print. Ital Underline. Powe	Matrix impact 10.0 \$299	185 rated 43.6 default 13.0 quality	5.0 10.0 8.0 12.0 8.5 17.0	PLHFLHTVI	60 74	<b>P</b>
Epson: Sp	Epson 1 X-90: F Double-Strike. . Near Letter ( Default. Emphas	Matrix Impact 9.5 \$329	100 rated 81.0 delauft 16.0 quality	5.0 12.0 8.0 17.6 10.0 20.0	JCLH FLHT VT	N/A 82	0 0

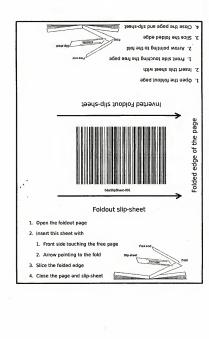
J. Follow instructions on the other side

Inverted Back



Back

1. Follow instructions on the other side



## PRINTER GUIDE

P. C. Magazine's Printer Guide will help you choose the printer of your dramn—or at least the one that will fulfill your printing needs. It includes most of the information you'll need in one, well-organized place. You'll undoubtedly start with the Guide's price column, but you should go beyond price when choosing a printer.

To make the best choice, first decide how you'll be using the printer and what you'll be using it for. That information will help you determine how fast you need it to print, how fancy its print qualify must be (as well as how fast it needs to print in a high-quality print mode), how quiet it needs to be, and whether compatibility is a pertinent issue.

While the print samples in the Printer Guide abovy you what the printer's output looks like (blown up 440 percent), the listings of each printer's printing and formatting features of the printing in the printing in will go. Emphasized print and underlinen, for example, are useful for almost any document because they allow you to both-face or underline your prints or highlight your numbers. A printer with a writery of type phase can print everything from a speech or script in a wide spreadheet. The ability on the printing the printin

PC Magazine's Printer Guide also tells you about each printer's ext and graphics compatibility with the IBM PC, which can be important for applications ranging from screen dumps to database reports. The Guide also tells if your printer of choice is compatible with a more popular printer line, such as Epson or Diablo; if it is, that compatibility will almost guarantee seamless word process-

ing or graphics support.

The Printer Guide is helpful when you make a printer-buying decision because it shows you a large amount of information in a very small place. But don't overlook the writen reviews—it's there that you'll find those immeasurable qualities that can make all the difference in the world.



# AT STAND OUT.

Visit your local computer store and judge the complete line of Canon printers firsthand.

You'll find the print quality is absolutely crisp. The graphics are remarkably clean. And the reasons for buying one are perfectly clear. For more information.

For more information, call 1-800-323-1717, ext. 300 (in Illinois, 1-800-942-888,1, ext. 300). Or write Canon U.S.A., Inc., Printer

Division, P.O. Box CN 11250, Trenton, NJ 08650. oge the complete inte of

CIRCLE 213 ON READER SERVICE CARD





| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100



Vincent

THERMAL TRANSFER

BUBBLE-JET

			INTER GUI	_			
MANUFACTURER: MC		TYPE, CARRIAGE WIDTH, PRICE	SPEED: Characters per second	TYPE PITCHES: Characters per inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
Qm	CO: Legend 1080  CAL ABCO Legen asized. Double er On Default. ite. <u>Underline</u> .	Matrix Impact 10.0 \$339	100 rated 49.3 default 17.3 quality	5.0 12.0 10.0 16.5	PLH FL HT VT	52 75	<b>○</b>
Axiom: D	X 2000	Fully	20 rated	20 rated 10.0 15.0		60 71	
Qm	Axiom DX2000: Pc Shadow Print. Und wer On Default. F derline. Bold and	Formed 13.7 \$399	20.4 default 13.4 quality	12.0	PJCLHFLHT VT		- <del>**</del> • • • • • • • • • • • • • • • • • •
Panasonic:	: KX-P1091	Matrix	120 rated	5.0 10.0	HVCUS	60 74	0.0
Qm	Panasonic KX-P sized mode. Do r quality. Und ode. Power On	Impact 10.0 \$399	58.5 default 17.3 quality	6.0 12.0 8.5 17.0	LHFLHTVT		- P
Alphacom	: Alphapro 101	Fully	18 rated	10.0 15.0	HVUS	82 74	
Qm	Alphapro 101: Shadow. Double erline. Shadow ult. Underline	Formed 13.0 \$428	16.3 delault 6.5 quality	12.0	LHHTVT		0
CAL-ABC	O: Legend 1385	Matrix	160 rated	5.0 12.0	HVCUS	N/A 78	
Qm	Legend 1385: Spacing. Enhanc lined. Power On g. Enhanced Dox	Impact 17.5 \$449	61.5 delault 20.0 quality	8.25 16.5 10.0	PLHFLHTVT		<b>P</b>
Citizen: M	ISP-10	Matrix	160 rated	5.0 12.0	HVCUS	60 72	0.0
Qm	Citizen MSP-10 d Mode. Double Italic Mode. C verse Image Fr	9.5 \$449	85.3 default 27.9 quality	5.0 17.0 8.5 20.0 10.0	LHFLHTVT		- P
Epson: DX	K-20	Fully	20 rated	10.0 15.0	HVUS	N/A 74	
Qm	Epson DX-20: Shadow Print. roportional Spacin Print. Shadow	Formed 13.0 \$459	22.0 default 14.0 quality	12.0	PJCFLHTVT		- <del>8</del>

	-	PRI	NTER GUI	DE			
MANUFACTURER: MC	DOEL	TYPE, CARRIAGE WIDTH, PRICE	SPEEO: Characters per second	TYPE PITCHES: Characters per inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
Antex Data	a Systems: ADS 2000	Matrix	165 rated	14 11	HCUS	56 75	0
Qm	ADS 2000: Pow- DG Double Stri rint Emphasized ower On Defaul	Impact 10.5 \$495	00.3 definall 20.3 quality	6.0 12.1 6.35 16.1	PLKALKTYT		P
Axiom: D	X 2500	No.	20 mind	10.0 15.0	HVUS	60 76	
Qm	Axiom DX 2500: P . Shadow. Auto Un Bold Print. Shado Default. Bold Pri	Formed 15.8 \$499	20.1 delault 13.4 quality	12.0	PJCLHFLHT VI		<b>X</b> D
Epson: FX	(-85	Matric	100 rated	8.8 12.0	HVCUS	N/A 75	00
Qm	Epson FX-85: Emphasized Pri On Default. Bo ar Letter Qual	Import: 10.0 \$499	80.6 default 21.6 quality	8.0 17.1 8.5 28.0 10.0	PLHFLHTVI		0 0 0 0
NEC: PC-	PR105A	Matrix *	92 rated A	5.0 10.0	HYCUS	WA 70	
Qm	NEC PC-PR105A: lics. Emphasiz Power On Defau . Double Strik	10.6 \$499	45.4 default 27.2 quality	6.0 12.6	PLHFLHTYT		00
Okidata: 1	Microline 192 (Std.)	Batte	160 rated	5.6 10.0	HVCUS	55 79	OO
Qm	Okidata Microl 1f-Dot Enhance Emphasized (Ho ce Quality. Po	1.5 \$499	SE.S default SE.S quality	8.0 12.6 8.5 17.1	PLHFLHTVT		8
Okidata: 1	Microline 192 (IBM)	Matrix	100 rated	6.0 16.0	HVCUS	55 76	00
Qm	Microline 192: sphasize. Corr ence Enhanced. phasize. Corre	8.5 \$499	St. 6 celuli St. 6 quality	85 17.1	PLKRITYT	1	0 0
Star Micr	onics: SG-15	Metrix	120 rated	5.0 10.0	HCUS	65 89	
0-	Star SG-15: P	Impact 15.5	67.7 default 20.0 quality	8.0 12.0 8.35 16.0	PLEFLHIVE		• • • • • • • • • • • • • • • • • • •
um	LO Double Stri	\$499			PURPLHIVE	3	na.

		PR	INTER GUI	DE			
MANUFACTURER: M	DOEL	TYPE, CARRIAGE WIDTH, PRICE	SPEEO: Characters per second	TYPE PITCHES: Characters per Inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
Westrex	Products: Westrex I  Westrex 1: Po Quality. Itali core. Double S spondence Qual	Matrix Impact 10.0 \$499	140 rated 58.5 default 20.0 quality	5.0 10.0 5.25 12.5 8.3 16.7	HVUS	65 79	<b>○</b>
Qm	Datasouth Persuit. NLQ mode. e mode. Emphas efault. NLQ mc	Matrix Impact 10.0 \$545	160 rated 78.5 default 25.8 quality	5.0 10.0 6.0 12.0 8.5 17.1	HCUS PLHHTVT	59 74	<b>P</b>
Qm	NEC 370 ELF: adow. Underlin Shadow. Underl e. Shadow. Und	Fully Formed 12.0 \$545	19 rated 15.3 default 11.3 quality	10.0 15.0 12.0	H V U S	55 76	<b>Q</b>
SCM: Sm	ith-Corona D-200  Smith Corona Diefault. Emphas Proportional Pr: Mode. Power On	5.0	160 rated 84.2 default 23.0 quality	5.0 12.0 6.0 12.5 0.3 16.7 10.0 25.0	H V C U S	63 75	• • • • • • • • • • • • • • • • • • •
C. Itoh: 8	C.Itoh M-8510: Proportional Pre. Power On De 1 Print. Italic I	Matrix Impact 10.0 \$549	180 rated 66.0 default 43.1 quality	5.0 10.0 5.0 12.0 8.5 17.0	HUS PLHFLHTVT	N/A 01	N ?
IBM: Pro	and Uverscore Double Strik nder and Uvers ized. Double S	Matrix Impact 10.0 \$549	200 rated 90.9 default 30.8 quality	5.0 10.0 5.0 12.0 8.55 17.1	HVCUS	63 82	<b>P</b>
Om Q m	DX-15XL: Powe: adow print. Unible print. Shai Default. Double	Fully Formed 13.5	17 rated 10.4 default 10.2 quality	10.0 15.0 12.0	VUSR PLH FL HT VT	65 75	0

		PRI	NTER GUI	DE			
MANUFACTURER: MC	DOEL	TYPE, CARRIAGE WIDTH, PRICE	SPEED: Characters per second	TYPE PITCHES: Characters per inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
Panasonic	Panasonic KX P Letter Quality rint. Bold and Letter Quality	Matrix Impact 10.0 \$599	180 rated 76.7 default 22.0 quality	6.0 10.0 6.0 12.0 8.5 17.0	HVCUS PLHFLHT VT	62 72	<b>O</b> O <b>O</b> O
Star Micro	SD-15: Power hasized print. r Letter Quali trike. Emphasi	Matrix Impact 15.6 \$599	160 rated 84.2 default 28.3 quality	5.8 10.8 6.0 12.8 8.5 17.8	HVCUS PLH FLHTYT	63 78	• • • • • • • • • • • • • • • • • • •
Q m	Panasonic KX-P Print. Shadow or word by wor t. Shadow Prin	Fully Formed 15.5 \$659	22 rated 22.1 default 9.4 quality	18.8 15.0 12.8	HVUS PJCLHFLHT VT	63 71	<b>X</b>
Epson: FX	X-185  Epson FX-185: Double Strike alics. Power D Strike Print.	Matrix Impact 16.0 \$699	160 rated 80.0 default 21.0 quality	6.0 12.0 6.0 17.1 8.6 20.0 10.0	HVCUS PLH FL HTVT	NA 74	<b>P</b>
Okidata: N	Microline 193 (Std.) 193: Power On Enhanced. <u>Unde</u> ondence Emphas <u>Correspondence</u>	Matrix Impact 16.0 \$699	160 rated 95.9 defaell 34.5 quality	6.0 10.0 6.8 12.0 8.5 17.1	HVCUS PLH FL HT VT	55 78	<b>?</b>
Okidata: N	Microline 193 (IBM) Okidata Microl lt. Emphasized pondence Quali us Underlining	Matrix Impact 16.0 \$699	160 rated 95.9 default 34.9 quality	5.8 10.0 6.8 12.8 8.5 17.1	HVCUS PLH FL HT VT	55 76	0
IBM: Colo	or Jetprinter  IBM Color Jetp ble Strike. Po Power On Defau fault. Double	Color Matrix Ink Jet 9.5 \$745	30 rated 18.8 default 13.5 quality	5.0 10.0 8.3 16.7	H C U S R	45 < 60	0

PC MAGAZINE • SEPTEMBER 17, 1985

		PR	INTER GUI	DE			
MANUFACTURER: MC	DEL	TYPE, CARRIAGE WIDTH, PRICE	SPEED: Characters per second	TYPE PITCHES: Characters par inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IBM PC Graphics Other printers
SCM: Smi	scm D-300: Pc nt. Near Lette g. Proportional S Power On Defau	Matrix impact 15.5 \$745	160 rated 91.9 deteutt 25.0 quality	6.0 10.0 8.0 12.0 8.3 16.7	HVCUS PLHFLHTVT	63 78	<b>P</b>
Xerox/Dia	blo: Advantage D 25 Diablo Advanta d Print. Shado ortional Spacing. F nt. Shadow Pri	Fully Formed 15.0 \$745	20 rated 23.3 default 14.8 quality	10.0 15.0 12.0	HVUS PLHFL HT VT	58 69	0
Qm	Star SB-10: P y, LQ Double S Default. Lette Q Emphasized.	Matrix Impact 10.0 \$749	120 rated 73.6 detault 33.9 quality	6.0 10.0 6.0 12.0 6.35 16.7	H V C U S	70 79	<b>♥ ♦</b>
Datasouth:	Personal Printer II  Datasouth Pers t. Near Letter r On Default. lined. Power 0	Matrix Impact 17.0 \$795	160 rated 71.9 default 23.3 quality	6.0 10.0 6.0 12.0 8.5 17.1	HCUS PLH FL HT VT	59 74	<b>P</b>
Star Micro	Star SR-15: P • Emphasized p er On Default. nt. Near Lette	Matrix Impact 15.5 \$799	200 rated 101.6 default 29.0 quality	6.0 10.0 6.0 12.0 6.5 17.0	HVCUS PLH FL HT VT	63 78	<b>9 9</b>
Citizen: M	SP-25 Citizen MSP-25 d. Double Stri ndence Quality Double Strike.	Matrix Impact 15.0 \$849	200 rated 93.3 default 32.3 quality	5.0 12.0 6.0 17.0 6.5 20.0 10.0	HVCUS PLH FL HT VT	60 73	<b>9</b>
Dynax-For	Fortis DM20: e. Double-Stri ode. Proportior ear Letter Quality	Metrix Impact 16.0 \$888	160 rated 90.9 default 21.3 quality	5.0 10.0 6.0 12.0 6.35 16.7	H V C U S	65 75	• • • • • • • • • • • • • • • • • • •

		PRI	NTER GUI	DE	-		
MANUFACTURER: MO	ODEL.	TYPE, CARRIAGE WIDTH, PRICE	CARRIAGE Characters WIDTH, per second		FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY ISM PC Graphics Other printers
Qm	Printer  MPI XS Printe ble Strike. Bo Default. Bold. e Strike. Powe	Matrix Impact 9.5 \$895	180 rated 119.0 detault 58.0 quelity	5.0 10.1 6.0 12.1 7.0 14.1 7.5 15.1 8.5 17.1	I UE UTVT	N/A 82	00 P
Q m	Datasouth DP-: rint. Boldface Default. Doub! erline. Power	Fully Formed 16.5 \$995	36 rated 32.9 default 11.8 quality	10.0 15.1 12.0	PLH FL HT VT	85 78	<b>V X D</b>
Q m	Juki 6300: Po adow Print, Sh e. High Qualit d Print, Shado	Fully Formed 18.0 \$995	32 rated 32.0 default 23.0 quality	10.0 15.0 12.0	PJCLHFLHT VT	60 73	<b>X</b>
Q m	O: Legend CP-VII Ledgend CP-VII d. Double Stri phasized. Doub ult. cmphasize	Color Matrix Impact 17.0 \$1,195	90 rated 31.0 default 23.8 quality	8.0 12. 8.0 17. 8.7 20.1 10.0	4	N/A 58	PS DE
C. Itoh: 2-	C.Itoh 24LQ: ce Mode. Near nal Mode. Italia Mode. Power On	Color Matrix Impact 16.0 \$1,299	200 rated 164.8 default 81.8 quality	8.0 10.1 6.0 12.1 8.5 17.0	1	64 73	
NEC: Pin	NEC pinuriter ch high speed. igh density. Proj y. Proportional si	Color Metrix Impact 18.0 \$1,399	180 rated 84.2 deleuit 20.1 quality	8.0 12. 8.0 17.1 10.0		82 70	- P E
Primages: Qm	Primage 90  nderscore. Pow dow Print. Bol r On Default. and Shadow. Un	Fully Formed 16.5 \$1,492	90 rated 50.0 default 18.0 quality	10.0 15. 12.0	PJCLHFLHT	57 72	- <del>**</del> • • • • • • • • • • • • • • • • • •

		PRI	NTER GUI	DE			
MANUFACTURER: MI	DOEL	TYPE, CARRIAGE WIOTH, PRICE	6PEEO: Characters per second	TYPE PITCHES: Characters per inch	FEATURES: Printing Formatting	SOUNO LEVEL: Decibels	COMPATIBILITY: IBM PC Graphics Other printers
Qm	Centronics PS ized print (do Power On Defau trike). High s	Metrix impact 10.0 \$1,495	160 rated 84.2 default 69.0 quality	8.0 12.0 0.0 17.0 0.0 20.0 10.0	HYCUS PLH PLHTYT	62 78	<b>P</b>
Dynax-Fo	rtis: DM40	Matrix Impact	160 raind 64.0 delauit	10.0 10.0 12.0	HVUS	85 78	0
Qm	Shadow Print. Bold Print. Sh On Default. Bo	10.0 \$1,495	68.0 quality	and the	PJCLH FL HT VT		O 🖪
Xerox/Dia	blo: 34LQ	Matrix	270 rated	0.0 10.0	HVCU8	E 60 70	00
Qm	Diablo Compani phasized Mode. rint. Underlin t. Power On De	18.0 \$1,599	138.1 default 41.8 quality	0.0 12.0 0.7 13.3 7.5 10.0 0.0 10.7 0.6 17.1	шкнуг		P 000
Toshiba:	P351	Matrix	286 rated	5.6 10.0	HVCUS	68 76	O
Qm	Toshiba P351: ite. Courier, 1 Bold. Power On ier. Proportion	impect 10.0 * 3 \$1,895	100.0 default 68.0 quality	9.0 12.0 6.7 10.4 8.3 10.7	PLH FL HT VI		Ö
NEC: Spir	iwriter 8850	Pully	66 mited	10.0 10.0	HVUR A	S 55 05 0	
Qm	dow. <u>Underscort</u> t. Shadow Print Power On Defit Bold and Shad	Fermed 18.0 i :: \$1,990	44.0 default 10.0 quality	12.0	PJCHFLHT		<b>O O O O O O O O O O</b>
CIE: CI-3	500 TriPrinter	Matrix (%)	350 rated	8.0 10.0	HVCU8 💥	56 78	00
Qm	CIE CI-3500 The t. Letter Qual e. <u>Underline Me</u> fault. Letter (	impact 18.0 \$1,995	246.6 default 73.0 quality	8.25 18.9 8.25 17.1	иажт		00
Genicom:	3310	Matrix	300 rated	9.0 10.0	HVCUS 1	61 75	0
Qm	Genicom 3310: Underline, Propo ult, Bold Prini nt, Power On Def	Impact 18.0 \$1,995	143.0 default 90.0 quality	0.0 12.0 0.0 10.0 0.4 10.7	PJUHFLHT VT		× × ×
C MAGAZINE • S	EPTEMBER 17, 1985						1

		PRI	NTER GUI	DE .				
MANUFACTURER: MI	DOEL	TYPE, CARRIAGE WIDTH, PRICE	SPEED: Charactera per second	TYPE PITCHES: Characters per Inch	FEATURES: Printing Formatting	SOUND LEVEL: Decibels	COMPATIBILITY IOM PC Graphics Other printers	
Hermes: I	Printer I  Hermes Persona n Default. Emp d WP Quality. Pow WP Quality. Empha	Matrix Impact 18.0 \$1,995	200 rated 120.0 default 85.0 quality	5.0 12.0 6.0 15.0 10.0 10.0	H C U S	55 77	0 0	
(R M)	centronics 351 zed. Double St ear Letter QuaM. Q Double Strik	Metrix Impact 15.0 \$2,195	200 rated 143.9 default 26.5 quality	0.0 10.0 8.0 12.0 8.25 16.5	HCUS PLH FL HT VT	N/A 79	0	
Epson: SO	Epson SQ-2000: r Quality. Dra Italics. NLQ I On Default. Ne	Matrix Ink Jet 16.0 \$2,295	170 rated 115.1 default 95.9 quality	0.0 12.0 8.0 10.2 8.1 20.0 10.0	HVCUS PJLHFLHT VT	55 65	<b>?</b>	
Q m	Diablo 630 ECS t (double stri rscore. Power strike). Shado	Fully Formed 10.0 \$2,295	40 rated 37.9 default 22.3 quality	10.0 15.0 12.0	HVUSR PJCLHFLHT VT	63 78	<b>♥</b> • • • • • • • • • • • • • • • • • • •	
Genicom:	3320 Quiet  Genicom 3320 Q Shadow Print. Id Near Letter Id/Shadow Prin	Matrix Impact 15.0 \$2,395	300 raled 144.0 default 91.0 quality	Continuous from 4.8 to 10	HVCUS PLHFLHTVT	N/A 72	00	
Okidata:	Okidata 2410: espondence. Da Underline, Cor pondence Enhan	Matrix Impact 10.0 \$2,395	350 rated 215.8 default 47.3 quality	0.0 10.0 8.0 12.0 8.5 17.0	H V C U S R	N/A 01	0 0	
Genicom:	3310 Color  Genicom 3310 C Print. Underli rier LQ Font. Underlined. OC	Color Matrix Impact 15.5 \$2,450	300 rated 150.1 detault 95.9 quality	5.0 13.0 8.5 10.0 10.0 10.0 12.0	H V C U R P LH FL HT VT	63 82	<b>?</b>	

		PRI	NTER GUI	DE			
MANUFACTURER: MO	DOEL	TYPE, CARRIAGE WIDTH, PRICE	SPEED: Characters per second	TYPE PITCHES: Cheracters per inch	FEATURES: Printing Formatting	SDUND LEVEL: Decibels	CDMPATIBILITY: IBM PC Graphics Other printers
Genicom:	3410	Matrix	400 rated	B.0 13.0	HVU Min	63 80	e - Niebri
Qm	Genicom 3410: Underlined. OCI efault. Bold P CRB FONT. Powe	Impact 16.5 \$2,450	230.2 default N/A	8.5 10.0 10.0 18.0 12.0	PLHFLHTVT		× ?
Qume: Sp	rint 11/90 PLUS	Pully Stade at	90 rated	10.0 15.0	HVUS	62 70	d (a)
Qm	Qume Sprint 11, strike with 3 ine. Power On D. trikes. Shadow	Formed 18.0 \$2,500	62.0 delault 37.1 quality	12.0	PLH FL HT VT		00
Hermes: 6	15 Color Printer	Color Matrix	400 rated	8.0 10.0	HVCUBB	56 70	
Qm	Hermes 615: Power Inderlined. Power On Lined. Power On Di	impact 15.0 \$2,595	95.9 detault 40.8 quality	8.0 12.0 7.5 15.0	PLH FL HT VT		<b>♥</b>
Qume: Sp	rint 11 Widetrack	Fully 1615	50 rated	10.0 15.0	HVU8	60 78	e to second fit
Qm	Qume Sprint 11+ Strike. Shadow. . Bold Two Stri On Default. Bol	Formed 22.0 \$2,990	38.4 default 24.7 quality	12.0	PLH FL HT VI		-×0
BDS: Lase	er 630/8	Tale 187	0.4 mile mind	10.0 12.0	VUS	N/A <60	
Qm	BDS Laser 630/8 erscore. Bold a r On Default. / w Print. Italia	\$3,495	8.1 ppm rated 75.0 detault 75.0 quality		нени		0
Apple: La	serWriter	Later	8 ppm rated*	8.0 10.0	HVUS	N/A < 60	
Qm	Apple LaserWrit Italics. Ita Roman Bold. Time Helvetica. Helvetic	9.5 \$6,995	108.0 default 108.0 quality	8.7 12.8 8.8 10.0	PLHHTYT	Sec. 10	D <sub>Q</sub>
QMS: Las	ergrafix 800	Later Skilled	8 ppm rated*	Depends	Depends	<55 < 60	
Qm	QMS Lasergrafiz . Roman Bold. Roma Power On Defaul n Italics. Apollo Mec		115.1 detault 115.1 quality	on fort installed	on foot installed PACLH FL HT VT		0 0

# EDITOR'S CHOICE

Of the bumper crop of printers reviewed in this issue, nearly half were winners. And of these top performers, the very finest deserve a curtain call. This honor roll of the 16 best machines demonstrates that quality can be found in printers of every type and at every price level.

#### BY JOHN DICKINSON

hopping for a printer this year is no easy task. Not only do you have to choose from a vast number of printers, but a large number of these are high-quality machines.

Last year's PC Magazine special printer issue was marked by a seemingly endless series of grunts, groans, and four-letter expletives as reviewers tried vainly to make a number of balky, incompatible printers work with the PC. Not that they were all bad—but the good ones stood out and the editor's choices were clear.

This year, PC Magaztine reviewers are singing long-winded songs of praise for the newest printers. The overall quality of these printers' designs, performance, construction, manuals, and technical support is much improved. Perhaps best of all, most of the printers we tested follow IBM, Epson, Diablo, or Qume command secuences (some offer two, and others, three of these standards), making them compatible with a wide variety of PC software.

As a result, this year's editor's choices were not so easy to make. In fact, if I had included the runner-ups in the list, nearly half the printers tested would have appeared in this article (see the individual reviews to find out what machines are next in line). Meanwhile, here's the editor's choices of the top-of-the-line printers for every budget.

#### Okidata Okimate 20-\$268 (with Plug

When I first saw this little gem, I when I first saw this little gem, I when the abilities of this toy-size printer. The Okimate 20 color thermal printer is so tiny, it looks like a telephone-answering machine, even more so because it has a cassette-mounted color ribbon that looks like it could slide into your Walkman. My first impression quickly faded, however, when reviewer Robin Raskin got the Okimate running for the first time.

The thermally printed colors are bright, and its graphics or character-image definition is crisp, even if you don't use the recommended clay-surface paper. In addition, Okidata's software makes child's play of color graphics screen dumps. Okidata designed the Okimate to work with everything from a small Commodore computer to the AT. Whatever computer you hook it up to, the Okimate 20 produces good color output.

The Okimate's modest price makes it a good choice for a second printer for color or an entry-level printer for home use. Print quality, especially in the monochrome near letter-quality mode, may even make the Okimate 20 a reasonable

first printer for the small-business user.

With the Okimate 20 on the market, you have no excuse for not having a color printer.

C. Itoh ProWriter Jr.—\$299

If you want to set yourself apart from everyone else with a low-cost dot matrix



printer, you should rush right out and buy a C. Itoh ProWriter Jr. This spindly legged, insect-like critter looks oddly different from just about any printer you've probably ever seen. However, don't let its looks fool you—this new entry-level printer offers good-quality printing at a very reasonable price.

The ProWriter Jr.'s paper transport design is responsible for its odd looks. Paper travels from beneath the printer's steel wire print stand, underneath the vertically mounted printhead, and out the back without a jaim or hitch of any kind. The printer has no top cover to get in the way by falling off, and its footgrint is about as small as it can be and still be able to print on standard-size neare.

The ProWriter Jr.'s correspondence quality printing is good, and you can use the ProWriter Jr. with any Epson-compati-

the ProWriter Ir. with any Epson-compatible word processor or software package. Don't pass over the ProWriter Ir. if you're in the market for a low-cost matrix

#### Panasonic KX-P1091-\$399

The Panasonic name has long been associated with high-quality, inexpensive consumer electronics, and the company's expanding line of microcomputer printers clearly indicates its intent to bring that reputation into the microcomputer business. The Panasonic KX-P1091 matrix printer

doesn't let that reputation down. When PC Magazine tested the KX-PIO91 last year, it looked like it had some potential, but the printer was delivered with no documentation, and representatives at the company's New Jersey offices gave absolutely no help. This year, that same printer came with an excellent manual that says it is fully Epson and IBM compatible and is easy to set up and use.

An enthusiastic, knowledgeable support staff was ready and able to answer our questions.

But it was only when reviewer M. David Stone fired up the test programs that the really good news about this printer became evident. The KX-P1091 cranks out

the best example of dot matrix printing you'll ever see in a 5399 printer. Its square dots produce excellent draft-quality text and graphics, and it has a near letter-quality font that will fool all but the most ardent daisywheel fans.

Its 58.5-cps speed won't win any drag races, but with its quiet 74 dba, the machine will become a comfortable office or home companion for your PC that makes only a tiny dent in your desk space. The KX-P1091 is a first-rate matrix printer at an incredible price.

#### Star Micronics SD-10/SD-15 Series— \$449/\$599 Star Micronics has completely rede-

signed its entire line of dot matrix printers, and the new models are in all respects better than the company's previous efforts. One of the best examples is its new SD-10/SD-15 series of 160-cps printers, which beats the new Epson FX series in both price and performance and appears to be a line of sturty, reliable machines.

printer.

The wide-carriage SD-15 costs only 599, and yet in was #8 2.cps while producing a sound level of only 78 dba. Like the other new Sar printers, it producing the the other new Sar printers, it produces from the carrier Bin PC character set. The SD-10 (not tested in this issue) costs a mer six wide wide (10-inc) carriage. While not specially the control of the sound that the correspondence quality print of the SD-15 is as good as you should expect for the price and certainly good enough for internal correspondence or home use.

You may not spot the Star SD series the first time you look at the printer chart because we only tested the more-expensive model. But, be sure to look for these results and check out all of these Star printers at your local dealer.

#### Epson FX-85/FX-185-\$499/\$699

If Epson's new FX series printers prove nothing else, they prove that Japanese printer designers can turn on a dime. Within weeks of IBM's attack (marked by the introduction of its U.S.-buil Proprinter), Epson let PC Magazine know it would get a first look at Epson's FX-85 answering volley. The response from the Japanese manufacturers was swift and sur-

The FX-85 is not just a dusted-off version of Epson's 2-year-old FX-90 (160-cps matrix printer. Improvements include a new top and undercarriage design that make paper loading not only possible, but absolutely easy (loter versions made paper loading very difficult); faster vertical paper-feed speed; and quieter operation. The net result is that be FX-85 is easier to use and runs nearly 20 cps faster and 7 dba more quietly than the older mode.

But the best news is in the FX-85's features department. It includes IBM Graphics printer compatibility (including the full IBM character set and command sequences), along with radicional Epson printer compatibility. In addition, the new printer produces good correspondence-quality printing at the behest of a command secuence or touch of a front-anal button.

For \$200 more, you can get the same features in the wide carriage Epson FX-185, and for an as yet unspecified price (about \$80), you can upgrade your Epson FX-80 and FX-100 printers to an FX-85 or an FX-185. Nice going, Epson.

NEC Spinwriter 370 ELF-\$545

NEC Information Systems is not known for low-cost or low-quality printing machines. However, the new Spinwriter 370 ELF-changes the low-cost part of that reputation. The L'il ELF, as we affection-ately call it, with sour hearts by costing less and operating more quietly than any NEC thimble printer we've ever tried and with no sacrifice in the legendary NEC Spinwriter printing quality.

At 91 cps, the
Proprinter is faster

than Epson's FX-85

and most printers in its

class. At 82 dba, it's

also noisier.

The ELF isn't a speed demon, but it does chug along at a reasonable 17-cps pace—that's fast enough for many applications. And, taking into consideration NEC's wide selection of thimble-mounted fonts, we have to admit that the ELF is an ideal machine if you're looking for a small-business or home printer or a moderately priced companion to a high-speed matrix model.

#### IBM Proprinter—\$549 IBM stunned just about everyone with

back.

its new \$549, domestically designed and manufactured dot matrix printer, dubbed the Proprinter. The Proprinter is the first frontal assault by a American company on Japan's traditional low-priced dot matrix printer turf.

At an effective speed of 91 cps, the Proprinter is faster than Epson's FX-85 and most other printers in its class. Unfortunately, at 82 dba, it's also noisier. But its unique and well-designed paper-feed mechanism may make up for that draw-

Besides the normal (9½-inch) tractor feed, IBM's new printer includes an alternate "paper door" that is built into the lower-front cover. You can insert single sheets of paper through the door and, more important, those single sheets can be envelopes, the eternal bugaboo of computer printers. The door works well and will happily print on normal and odd-sized envelopes as long as your word processor or database program is able to format the addresses for you.

The Proprinter is ruggedly built on an automated production-line and is made up of high-impact, high-tensile-strength plastic throughout. It also features a lead-screw-driven Epson printhead, which offers very accurate positioning throughout the long life you can expect from this IBM printer.

The Proprinter is a good desktop printer—but do listen to it before you buy.

#### Panasonic KX-P3151-\$659

Panasonic's KX-P3151 daisywheel entry is yet another sign of the company's intentions in the printer race. This printer combines nearly unmatched price and performance with excellent construction quality and ergonomically thoughtful design that includes lower noise levels than are normally found in this class of daisywheel printers.

The KX-P3151 is also easy to use, sporting Diablo-compatible command sequences and an easily understood manual. Its output ranks with top-of-the-line fully formed character printers. It's a great printer at a great price, and it performs well enough to be a primary printer for any PC user.

#### Star Micronics SB-10-\$749

The SB-10 represents a real departure for Star Microsito because it is the company's first attempt at a high-end, 24-pin dot matrix printer. The new printer uses the matrix printer. The new printer uses the trix printers, and Star Microsito's for the designs are at least a good. At nearly 34-eps in correspondence-quality mode (73 - 50 ps) in correspondence-quality mode (73 - 50 ps) country juried model (the P1344) and uses Epoten-compatible command sequences (except for graphies). The SB-10 is command sequences (except for graphies). The SB-10 is command to make to down a down at la software on the market today.

spread retail distribution, you'll have no trouble finding an SB-10 or obtaining service and support. Star gets a "gold star" for the SB-10.

#### Primages Primage 90—\$1,492

How do you get 50-cps fully formed character printing at low-noise levels and a low cost? You buy a Primages Primage 90.

This industrial strength daisywheel enny employs the latest print-in-light (PIF) technology and a teflon-coated lead screw to quietly and accurately position the print head as it files across your paper. The net result is a fast, quiet, and incredibly smooth operation. The Primage 90 was designed in New York but is manufactured in Taiwan to keep costs down.

I atwan to keep coss sown.

The printer's optional single or double bin sheet feeders work perfectly (the triple bin does too, if, you want to feed envelopes) as does its recently redesigned self-loading tractor feed. Diable 530 compatibility is complete, right down to the HType-Liribbons, and the printer offers a good selection of printwheels that don't seem able to wear out.

. The Primage 90 is mild-mannered enough for home use. I ought to know because the one that sits in my office at home is the first high-performance daisywheel I've used whose clatter hasn't caused my wife to complain, my dog to howl, or the plaster to fall down off the walls.

The Primage 90 is a natural choice if you're looking for quiet, reliable high-speed daisywheel printing.

#### Centronics Printstation 240—\$1,495

A 24-pin salute goes to Centronics for the excellent design and output quality of its new Prinstation 240 dot matrix printer. This midpriced printer will unobtrusively sit in your office and print what looks for all the world like the product of a daisywheel printer.

Better yet, it's fully conversant with almost any software that runs on a PC because it speaks both Diablo 630 and Epson printer command languages. It even produces fine-looking IBM-compatible graphics when you durn a screen or as software program to draw a pie chart on your printer—something you won't find in most dot matrix printers of this class. Based on the way the company's product line is developing, I'm glad to see that Centronics is back in the printer market. If you check out the Printstation 240, you will be too.

#### Toshiba P351-\$1.895

I didn't think Toshiba would dare mess with editor Bill Machrone's favorite P1351 printer, but it did and came up with yet another 24-pin dot matrix printer clas-

The Primage 90 is the

first high-performance daisywheel whose

clatter hasn't caused

my dog to howl or the

plaster to fall down.

sic. The P351 improves on the looks and ergonomics of the older model and adds selectable font cartridges to its already spiffy downloadable correspondence-quality fonts.

The P351's print quality comes up to Toshiba's superb standard, and its printing speed has improved from the older model to 108 cps. The new printer does not offer IBM-compatible graphics.

If you don't already have a printer on your Christmas list, put the P351 on it.

#### Epson SQ-2000-\$2,295

I never thought the day would come when I'd see a high-speed, high-quality ink jet printer, but that day has arrived and so has Epson's new SQ-2000 printer. You can add, "No muss, no fixs," when you talk about this silent beauty because the SQ-2000's ink tank design is about as leak-proof as is possible in an ink jet printer.

Its output should be good enough for almost anyone. The SQ-2000 is suitable for draft printing or finishing off a business letter in its correspondence-quality mode. Graphics are compatible with the IBM PC's, but that's no surprise given Epson's contribution to that standard. If you have a yen for silent printing but don't want to go for a laser, you shouldn't miss out on the SQ-2000.

#### Okidata Pacemark 2410-\$2,395

This year's Okidata Pacemark 2410 high-speed dot matrix printer is different s from last year's model because it is fully in BM compatible. That means Okidata's hop-of-the-ine machine will now print the entire PC character set and respond to all IBM Graphics printer command sequences, including graphics.

The new 2410 still produces amazing correspondence-quality printing for a 9-pin matrix head. As an additional fringe benefit, the new model goes about 10 cps faster in default mode (Okidata officials claim this can't be true, but we retested several times to make sure, and it is). Better yet, you won't find a printer that can dump a graphics screen faster than the new Pacemark.

The legend continues. The Pacemark 2410 remains the printer of choice for anyone wanting high-speed, reliable correspondence-quality matrix printing.

#### Oume Sprint 11/90 PLUS-\$2,500

Any daisywheel printer that sprints along at nearly 63 cps has a right to the name Qume gave its new Sprint 11/90 PLUS. Its performance is unmatched among fully formed character printers.

And, as reviewer M. David Stone points out, print quality is just not an issue with this low-profile machine. The Sprint II-90 maintains compatibility with previous Qume Sprint models, making it easy to install and use with any popular word processing software that runs on a PC. About the only drawback to this machine is its notice, but you can reduce it with a good policy of the processing the process of th

Qume has a reputation for building trans-proof printers and, especially given this one's speed, the Sprint 11/90's \$2,500 price tag makes it a good buy if you're in the market for a high-performance daisywheel printer.

#### Apple LaserWriter—\$6,995

Make no mistake about it—Apple Computer's LaserWriter is the best of the



Use your PC and printer like a typewriter — and more instantly, even during another program!

Type . . .

Print text on a line-by-line basis — just like a memory-typewriter. Great for addressing envelopes.

Fill in pre-printed forms . . . . Create a file of your own office forms using Softype's \*\* exclusive \*Define\* program. Then select a form, fill it out on-screen, and print — no mistakes!

Control your printer . . . Select any type size or style your printer will support. Works with any type of printer.

Risk-Free Money-Back Guaranteel
Try Softype™ for 30 days. If not completely satisfied, return the package for a full refund!

\*formerly ProType at \*119.95

non copy-protected s65

order toll-free: 1-800-446-2263 in Washington: (206)641-8411

> VISA MasterCard Company PO's accepted

Photon Software, Inc. 14021 N.E. 8th. St. Bellevue, WA 98007

CIRCLE 176 ON READER SERVICE CARD



\$30A.editowick 56-015
\$20L007

#### CIPCLE 197 ON PEADER SERVICE CARD

#### EDITOR'S CHOICE

current crop of Canon-engine-based laser printers. The printer's font designs are the genuine, properly licensed (from the copyright owner) articles, and the implementations are about as perfect as you can get with only 300-dots-per-inch image resolution. You'll have a difficult time telling the difference between LaserWriter output and typesetting.

The LaserWriter also runs faster than its competitors because its high-speed proces-

You'll have a difficult time telling the

difference between typesetting and Apple LaserWriter output.

sor doesn't take as long to format pages for printing. The wags who call the Laser-Writer Apple's best computer aren't kidding around—the MC68000 processor runs at a lightning-like 12 megahettz and has 1.5 megabytes of RAM for data storage and another 0.5 megabytes of ROM

for programs and font data.
As of this moment, the only way you
can successfully use the LaserWriter on a
PC is with Microsoft Word (Version 2.0),
and even then you can't get at all of this
printer's potential. But that's bound to
change quickly. Adobe Systems, which
designed the LaserWriter's PosScript openting software and implemented the
order of the program of the program of the program
word processing and other PC other
suppliers. I think it will get it too because
one, you have seen what this printer
do, you will want to purchase one and the
software to support it.

LaserWriter is the product that can put Apple Computer into a strong position in the corporate marketplace. If you doubt composed the composition of the whet-Packard Laserlets that are around corporate offices—many of them were installed before software support was readily available. If you want the best in laser printing, the LasetWriter is it.



## Sometimes the best way to get ahead is to go sideways.



The problem with spreadsheets is they get printed the wrong way. You still have o lot of stapling, gluing,

or taping to look forward to before your printout is readable.

To really get ohead, go Sideways."

Sideways is the dever software program that prints your spreadsheets—you guessed it—sideways. So your spreadsheet columns need never fall off the edge of your printer paper again. With Sideways on your side, no spreadsheet you invent with Lotus 1-2-g? Symphony, "VisiCole? Multiplan?" or SuperCole" is too widel And it's just as powerful on ally when you're creating far-into-the-future schedules and pert chorts. So for a presentable printiout, get rid of that glue stick and scotch tape—put your best foot forward and go Sideways.

You can go Sideways today with an IBM® PC or an Apple® III, and over a dazen different printen, including Epson®, Okidata, IBM® Apple® C. Itah and Monnesmann Tally. Ask for Sideways ar your local Computermann Tally. Ask for Sideways ar your local Computerman Tally. Ask for Sideways are store. Or mail a \$50 check to Funk Saftware, PC. Bax 1290, Combridge, MA 02238, Or col 617-497-6339, MC/Viso accepted.

## SIDEWAYS DEWAYS PRINTS SPREADSHEETS SIDEWAYS. CIRCLE 217 ON READER SERVICE CARD

# JAPANESE PRINTERS

Sony did it with its tiny transistor radios. Honda did it with its light-weight motorbike. Now Epson, Okidata, and other Japanese printer manufacturers have cracked the American market at the bottom—and locked up their position there. Will microcomputers be their next target?

#### BY JARED TAYLOR

memether the first time I saw an Epson printer." says Jim Buoly, president of Datasouth Computer Corp., a North Carolina-based printer maker. "It looked like a toy." Fitz Turner, director of corporate marketing for Dataproducts Corp. of Woodland Hills, California also members the first time he saw one of the Japanese company's printers. "It looked so cheap I remember wondering who

would want to buy the thing." The says.
As it happened, an awful lot of people
wanted to. Last year, 5.6 million printers
every 40th man, woman, and child in the
country. About 40 percent of them were
built by Epson, the number one printer
company in the world. Second plant
U.S. market share went to Okidata Corp.,
another Japanese company, and many
like Nipson Electric Company (NEC), C.
Into Dirital Products, Julic Office Machine

Corp., and Panasonic Industrial filled out the list of top sellers.

Japanese manufacturers dominate the low end of the American printer market. New companies like Sakata, Towa, and Janome keep showing up on our shores, while home-grown printer companies move up-market or die. Aside from IBM 's recent entry into the fray. American micro-computer printer companies have been in uniform retreat.

What accounts for this rout? Are we seeing the same phenomenon we saw in motorcycles, transistor radios, and 35mm cameras? Will Japanese companies move into computers next? What strategies are left for U.S. companies that want to compete?

Japanese dominance of the U.S. printer market can largely be attributed to two factors. The first was Epson's bold, perfectly timed introduction of the MX series, which set the stage for other Japanese electronics companies. The second is Japanese superiority in low-cost, high-volume electronics.

tromechanical manufacturing. Other factors, such as the strength of the dollar, long-term Japanese planning, and Japanese advantages in raising capital, have played a lesser role.

#### The Epson Factor

Epson's U.S. marketing strategy deserves an honored place in the annals of business. Rarely in the history of world trade has a company based in one counts staked out a brand new market in another country and exploited it as brilliantly as Epson did. Other companies may have foreseen the printer revolution that followdid the microcomputer revolution, but Epson made it happen. The company's first venture into the

In company's inst venture into the U.S. printer market was in the late 1970s with the deservedly forgotten TX series, originally designed as an DEM product for Jack Tramiel's Commodore Pet. That unsuccessful machine was followed in 1979 by the MX series, which took of like a shot. "Il was a big deal when a printer

broke through a thousand dollars," says, Cliff Bream, vice president of marketing for Epson America Inc. "The MX series initially crame in a traound \$800, and that was really big news." The MX was as reliable as it was cheap, and in 6 mooths it had 60 percent of the U.S. dot matrix market. "For a period of time we owned the market," says Bream, "but within 24 months we had major competitors."

Those competitors weren't American; they were Japanese. Okidata Corp. was the company that ended Epson's honeymoon. Jim Cullen, Okidata's manager of product marketing, willingly concedes that his company was only following Epson's lead. "They established the mar-

ket," he says. "We had to play canch-up." What Epson had established was a standard for low-cost printers. The technology wasn't exotic; the trick was to produce in volume and keep costs down. "The leadership was not in printing technology," says Cullen, "but in manufacturing technology. What really locked it in for us was the ability to meet demand."

#### In the Grand Japanese Tradition

Epon and Okidata were doing exactly what other Japanese companies have done to get into America. They went after the bottom of the market and were determined to be the low-cost producer. Sony did it with its inty transistor radio, I hond add it with its early, underpowered sedan that couldn't climb the steep streets of San Francisco.

Japanese companies go for the bottom of the market because that s' where case the tu.S. manufacturers most easily-reports are silm at the low end; so the case can beat U.S. manufacturers most easily-reports are companies figure they don't lose very much when they move out of it. Also, conce Epson had shown that printers are a commodity rather than a high-tech wonder. On the condy way to compete was on price. That takes commitment, investment, and exists commitment, investment, and exist mination, and the payoff can be years in the future.

So, as always, U.S. makers obligingly turned over the low-end market to the Japanese. They didn't seem to remember that once the Japanese get their hands on part of the market they want all of it. In the sixtles Honda started out with a 50cc machine. Harley-Davidson laughed at it. Now Honda makes monster motorcycles, and Harley-Davidson lives on government goodwill. There's a lesson here.

For now, as they lock up their position at the low end, Japanese printer companies are making the most of their manufacturing power. Okidata's factories, for example, are so highly automated that only 20 or

Epson established a

standard for low-cost

printers. The

technology wasn't

exotic; the trick was to

keep costs down.

30 people are needed to run a plant that turns out 20,000 printers a month. "The labor content is virtually nil in those printers," says Nasir Khan, vice president for marketing at Facit Inc. of Merrimack, New Hampshire. "They're practically molded in one piece."

NEC is an \$8 billion giant that makes everything from microprocessors industial robots to sleephone switching equipment. Bruce Thatcher, director of marketing for peripheral products at NEC Information Systems, points out that this allows the company to build nearly everything that goes into its printers. "We're so heavily integrated vertically hat we control the quality of every component right from the start," he says.

Mary U.S. companies are taking advantage of Japanes manufacturing provess by sourcing their low-end printers in Japan. Axiom Copp. of San Fernando, California, builds some of its printers here but boys its chapper models in Japan. Alen Adler, vice president of sales and marchiting, praises his Japanese OEM supplier not only for reliability but for fleibility as under the companies of the printers of the companies of the compani

it's done. I can't make changes that quickly in my American factories."

The commodity printer market demands extremely efficient munificating. As Fice's Khan explains, American companies generally price a product by adding your companies used. By the price of the comwealth of the companies of the comtent of the companies of the companies of the comtent of the companies of the companies of the comtent of the companies of the companies of the companies of the comtent of the companies of the compa

One reason Japanese compunies can searcifice immediate profits for long-term market control is that the financial struct of Japanese companies past less emphasis on quarterly profits. Unlike in the United States, where banks are barred from owning corporate stock, in Japan a secongany? many stockholder is often its lead bank. The bank's loams to the company of the property of the

This freedom from the American Osession with quarterly dividends means that Japanese companies can plan much longer campaigns that may lose money for years before they strike gold. "The Japaledom Wiese, produce marketing merity for Texas Instruments's peripheral proteaties of the produced marketing means part of the produced marketing means part for hobbystial came out, they looked document of the produced of the produced companies of the produced marketing and Another immagible that has beliefed Japa-Another immagible that has beliefed Japa-

anese manufacturers is their loyal employess. "The worker's whole life revolves around the company," says Axiom's Adler. "They are so involved with the company's success that they think of themselves as team members," he adds, "They work very hard to make the product perfect. Americans look at the clock; when it's time to go home, it's time to go home."

Finally, the incredible strength of the dollar has made things easier for the Japanese. With the dollar buying 250 ven rather than the 180 to 200 that economists consider reasonable. Japanese products in effect enjoy a 30 to 35 percent subsidy.

#### American Failings

Nevertheless, American companies could have done better than they did. The computer revolution was happening in their own home market, not 10,000 miles away, and they might have seen the need for low-cost printers first. Okidata's Cullen wonders why they didn't. "It always amazed me that the word processing people didn't get into the business. Companies like Lanier and CPT were already right in the middle of that market but didn't even see it-and they paid for it."

Harry Matsunaga, marketing manager of Panasonic's computer peripherals department, sees parallels in the automobile industry. When Japanese subcompacts first made a hit in the U.S. market, Detroit was determined to believe that small cars were a passing fad, mainly because they gave smaller profits. "The American printer companies were comfortable with the high-end business they already had," Matsunaga says, "Either they didn't see what was coming or they just didn't want

Matsunaga's views are echoed by Khan of Facit: "We were probably too tied up in the high end, and that's where our expertise was. We just hadn't planned on this explosion at the low end." Nor, according to Khan, do American companies have the staying power that Japanese companies do. "We're not as good at the how-longshall-I-hang-in-there kind of decision," he says. "We have shorter fuses."

And by the time American companies woke up to the fact that Epson had taken a huge market from right under their noses, it had become a commodity market that could be served only by efficient manufacturers with plenty of resources. Japanese printers were dropping off modern assembly lines by the thousands, while U.S. companies were still making them by hand. By then, the risks in setting up automated factories seemed too great for established American printer makers. Too

#### SON OF EP

Epson's phenomenal success with printers started from not-so-humble beginnings as part of the Seiko empire.

Ppson is part of the Seiko Group, a worldwide, \$3 billion conglomerate descended from a clock and watch trading company founded by Kintaro Hattori in 1881. The group, probably best known for its Seiko and Pulsar brand wristwatches, is one of the few major Japanese companies still controlled and managed by the family that founded it. Epson printers trace their ancestry

back to the 1964 Tokyo Olympics, when Seiko designed a device for timing athletic events. The company's legendary engineer, Susumu Aizawa, invented a quartz clock that also printed a record of the time. The timer led directly to the quartz watch, which garnered 12 percent of the world market for Seiko and brought the Swiss watch industry to its knees.

Manufacturers found a use for the printing device in desktop calculators, and by the early seventies Epson held 80 percent of the world market for such devices. Cash registers likewise were soon using the Epson print mechanism, which was known as the EP-101 (EP stands for "electric printer"). To sell this device, the current president of Seiko America, Yasuhiro Tsubota, first came to the United States in the mid-seventies. The EP-101 was also what gave the Epson Corporation its name: The dot matrix printer is the "son" of the EP-101.

The son has been prolific. Epson now produces nearly 1 million machines a month and has 40 percent of the world dot matrix printer market. Another 20 to 30 percent of the market is held by comanies that buy their printer mechanisms from Epson and build the machines around them.

Heretofore, the company designed and built its printers only in Japan. In Ocnouncing plans to build a 100,000square-foot manufacturing plant near Portland, Oregon. Epson's initial investment will be about \$10 million. In case the company outgrows the present 17acre site, it has an option on another 23 acres.

Epson plans to become even more American. The company is setting up a hardware and software research development center in Palo Alto, which will design and build prototypes. It has also founded a new software company, As-

Epson printers trace

their ancestry back to the 1964 Tokyo

Olympics, when Seiko designed a device for

timing athletic events. cent Inc., to write software for its line of personal computers.

The Hattori clan has come a long way from selling clocks. Its dozen or so ma ufacturing companies make everything from robots to lenses to camera shutters and even a hand-held LCD television set called the Epson Elf. The family also controls Wako, a high-toned Ginza department store.

According to recent reports, the current generation of Hattoris is divided between the high-tech modernizers and those who want to stick to the traditional watch and clock business. If Epson's success is any indication, the company tober 1984 it ended that policy by an- should go for high-tech. - Jared Taylor

great, that is, for everybody but IBM.

An IBM spokesperson won't say much

An IBM spocesperson won tay much more than that "IBM is committed to being a high-volume, low-cost producer," but the company is rumored to have spent many many millions of dollars getting its Charlotte, North Carolina, printer plant

IBM is rumored to

have spent millions getting its printer plant

ready for low-end

machines.

ready for low-end machines. If that's what in ow takes to get into the game, we won't be seeing many more American players. As Turner of Dataproducts points out, "You're looking at a pretty big number to swallow in order to get to the volume the playanese are producing. There aren't that many companies that can afford that kind of capitalization." No one is sure whether even IBM can make a go of it.

In the short run, IBM's decision will hurt Epson more than anyone else. Nearly 40 percent of Epson's U.S. sales were made under OEM agreements, and IBM took the lion's share of that. But Epson America's Bream claims the company can take the hit. "We knew they were going to do it," he says. "It won't hurt us at all."

Jack Whalen, Epson executive vice president sees IBMs decision as perfectly logical. "They've created a manufacturing capability that they think will give them market leadership," he says. "So ong as they were buying from us, we were getting an OEM profit. Obviously they think they can manufacture at cheeply as we can." As Whalen points out, labor with the best profit out, labor the buying from us, "I'es the one with the best," he says, "it's the one with the best,"

#### Living on Scraps

What's left for American companies who can't afford to build a \$100 million

printer plant? Almost all have abandoned the low-end market; those that haven't are either living on the scraps that the Japanese leave them or have turned into distribution companies for machines made in the Ori-ent. "At some point you've got to draw the line and decide not to commit industrial suicide by trying to compete," says Data-

ent. "At some point you 've got to draw the line and decide not to commit industrial suicide by trying to compete," says Datasouth's Busby. "You've got to position yourself elsewhere; we don't have a mission in life to compete with the Japanes." Dataproducts has made the same decision: "If we can't make money in a portion of the business, we won't be in it," says Turner.

Wiese of Texas Instruments says his company is doing likewise: "We're not company in doing likewise: "We're not company in doing likewise: "We're not company and the very low end.—The time is a commodify Justiense." In sale of the say of the

Facit will take the same approach. Its vice president for marketing emphasizes that OEM suppliers need short lines of communication with their customers. Japanese companies, Khan says, are too high-

"We're not competing at the very low end.

That's a commodity

business," says Wiese

of Texas Instruments.

ly automated and too far away to respond quickly to small, specialized orders. "We can take an OEM contract for a couple thousand units a year," he says. "The Japanese will walk away from that kind of business."

In October 1984 Epson announced plans to build a printer factory in Oregon. Before long, it too will have short lines of communication. And what kind of future is there in turning out a few thousand pink printers a year? Claims that American companies can hang onto the middle and high ranges aren't very convincing. The engineering, manufacturing, and marketing skills that Japanese companies have gained at the low end will be invaluable to them as they most printer and the printer a

IBM's entry into the

Japanese for a while,

but the future for other

American printer

makers looks gloomy.

er technology and are hard at work on liquid crystal shutters. It's only a matter of time before industrial-grade Japanese line printers stomp their way into mini and mainframe markets. Already Japanese printer makers are muttering about having to go easy on the Americans for fear of beines shut out of the market.

This has all happened before. IBM's entry into the market may thwart the Japanese for a while, but the future for other American printer makers looks gloomy. "This business could sure use a Lee lacocca." Says Axiom's Adler.

Computers Next?

Does their success in printers mean the Japanese will do as well in computers? Probably not, at least not for a while. But it's not that they haven't tried. NEC, Sony, Fujitsu, and Epson have all rolled out flashy lines of microcomputers that went nowhere.

Micros are not yet a commodity business. The only standards are IBM and Apple, and both companies keep changing the standard. The market doesn't sit still long enough for the Japanese to draw a bead on it. Also, Japanese software isn't up to American standards, and a computer without software is a piece of junk.

Epson America's Whalen is candid about his company's failure with desktop computers. Epson was ollower in that market, not a leader. "We didn't have the home court advantage we had in printers." develop an effective English-Inaquage operating system, it bought one off the shelf: CPM. Says Whalen. "As Luck would have it, IBM came out with an operating system that sweet the industry and left CPM in the dast. If we d' had the right operation of the shelf." CPM in the dast. If we d' had the right operation of the shelf of the dast in the dast. If we d' had the right operation of the dast in the dast. If we d' had the right operation of the dast in the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast. If we d' had the right operation of the dast.

NEC, which has more than half for lagnases personal computer market, has done no better. It has built fine machines, but it started out with a proprietary operating started out with a proprietary operating switched to IBM-compatibles but has well-defected to IBM-compatibles which has watched the company thinks ir may have been overconfident. "They were so dominant in the Japanese market, they thought they knew what's going on," he had be used their hands on it."

The real difference between American computer makers is that the computer companies have made their own products obsolete; they haven't waitmen of the for NEC and Pujitsu to do it for them. They've been bobbing and weaving and keeping the Japanese on the boy. Moving targets are hard to shoot down, but anything that sits still—and 6 months is too long—will be blown away by Japanese artillery.

As Facit's Khan says, "The day a computer becomes a commodity item, you watch out; they'll be there." The Japanese will wait patiently for that day; they're here for the long hau!. "One of the good things about the Japanese," according to Epson's Whalen, "is that when they make a commitment, it's for the millennium. We will return."

Jared Taylor, a contributing editor for PC Magazine, is author of Shadows of the Rising Sun: A Critical View of the Japanese Miracle. He is a consultant to companies doing business in Japan.

Me	n	ail or n thi	de	1	1		
pric	e i	in thi	is Ie,	,,	60	7	lam F Got exdent, BCI
We'll support,	serv	ice and warran	nty eve	rything	1	1 1	
charge you to	tand t	shipping or	6. We handlii	won't	r	1	1
nor will we penalize	-	1		1.5%	ν.	P	li di
you for using a	-23	10	-			gar a Bha	1/
credit card.	_					The same of	V.
					0		1
	MOD	EMS -		- BUSINE	SS		
B.C. Hayes Imerimosen 1200 Snormosen 12008 wisc Imerimosen 2000	364 95	Pro 1200 wise Pro 1200 Pro 12008 wise	260 95 300 95 259 95	Ashton-Tate office II Framework	279.95 279.95	Multiplan Mar	CARRIED .
irremoter (400	564 95	Pro 12008 who	259 96	Starter Kd	27.00		ettree ;
PERIP	HER.	AL CARDS	_	Subscription Consumers		AR GL IC	1
& A	CCE	SSORIES =		Auditor 2 1 Door Jones Market Anal +	100.00	Each to Beace Section	- Group 2
AST Idvantage w/128K	309 55	5-Pac w/38-6x Mod Graphic a	214.05 254.05 198.05	Market Mng +	149 95	PFS Fee PFS Report	hatten
destrings w128K Identified Pgy w0k I Pac+ w5K w64K Pac+ w5K w054k Curts Mg.	119.95	Musi Dapay Persyst Comb More widek	196.05	CEN A	909.90	PFS Report PFS Graph	
Pac+ wSX w3544 Curtis Mile.	309 95		384 95 384 95	Hervard Street	198.95		
hamond maraid	34 95 30 95	AT Quadrag w126k	324.95	Harvard Total PNP		SuperCalc III v : SuperProject v : IUS/AR	
Liby C Pedenal	50 95 34 95 19 95	Microscop w/128k	459.95 184.98	Cornerstone Lotus	269 55	LISCONORM	2
yelem Stand his Ya commend Cre	34 95 114 95		459 95 184,98 464 95 194 95 284,88	1 2-3 TK Solver	299.95 239.95	USOrder Entry Thou	ghiwara 2
	12 55	y Jean widels Quadrounds New Exp. widel New Exp. widels Gold widels Gold widels	204.95	Mag Your S Migreeten	105.95	Ingger gr	·
onus SSOO onus OSOO lavel MD 1 SSOO lavel MD 2 OSOO		New Exp. w/3844	349.95 379.95 469.95	R See 5000 R See 4000 UG	359.95 124.95	Desi Organizer	emer '
	19 95 26 95	God wildox	469.95 234.95	Microsoft Chert		Abitor Organizar	····
anov iraphic e	154 55 289 55	Street widels Street widels Liberty widels \$78 Product	234.95 289.95 289.95	Project	149 96 149 95		
Jornage Jernoulli 10mb	1719 95	RO + 2 wilds RO + 2 wilds	198.95	- UTILIT			
lernouti 20mb lernouti 10mb Carl Memory	2319 95 49 95	RO + 2 w/364x Chauffeur Tellermen	254 95 254 95	Antifeso Wester	OFT	WARE -	
44 Set (S) Side Set (S)	9 95	1G 5025 TG 6135	3409.00 2206.00 199.00	True Basic	96.95	Scievous	***
Mouse Systems C Mouse wPart Orchid	124.95	1G Interface		Sidelick CP Sidelick NCP	64.95 49.95 95.95	Macro + Password +	
		Jam II willed	198.05 479.05 299.05 309.05	Superkey Turbo Pascal v 3-0 Turbo Tool	95.95 39.95	Recalc +	
C Turbo 188 C Net	919.95 300.95	Jan II w 256k Jan II w 2mb	200,00	Turbo Graphics Decision Resource	30 00 64 00 54.05	PC Fambrush	otive 1
C Turbo 198 C Net w/Blossum C Net Daugner Blossum w/Bits	919,05 500-05 520-05 300-05 196-05	Captern w/64s Captern w/364s Graphics Master	170.95		224.95	Spongre Mile Basic Inter	rose4 2
Fossum w/84k Fossum w/84k	196.05						
		Graphics Master	249 95 449 95	Digital Research	199.95		
Pac wilds	174.95	AT MARRIED WIZER	449 95 309.05	Signification Gam Collection Gam Deskrap Gam Deskrap	144 95 34 95	Complete C Fostern	2
Pac wilds	RIN	TERS -	201.05	Digital Research Gam Collection Gam Desirap Gen Drav	144 95 34 95	Complete C Fostern	2
Pac wilds	RIN	TERS	201.05	Digital Research Gem Collection Gem Desirac Gem Desirac C PascalMT+ FUT C Rese Cores	144 95 34 95 127 90 209-95 229-95 430-95	Complete C Forten Beec Cotol Facel Macro Assem	and a second
Pac wide Financial Financi	RIN	TERS	490 95 500 95 644 86	Signal Research Gam Correction Gam Deleting Gam Deleting Gam Deleting Company	144 95 34 95 129 95 200 95 200 95 200 95 200 95 200 95	Complets C Fortran Seac Cotool Fascal Macro Assem Mis	restuff
Pac wides  Fac wides  Face MSP 10  Ram MSP 15  Ram MSP 20  Ram MSP 20	RIN	TERS Germs SP 10 Germs SP 10 Germs SP 10 NEC 2000 NEC 2000	490 95 500 95 644 86	Signal Research Gam Correction Gam Deleting Gam Deleting Gam Deleting Company	144 95 34 95 127 90 209-95 229-95 430-95	Compters C Fortran Seec Cotol Fascal Macro Assem Mis Crosson Famole	restur.
Pac wides	RIN	TERS Germs SP 10 Germs SP 10 Germs SP 10 NEC 2000 NEC 2000	490 95 500 95 644 86	Digital Research Dam Corector Cam Desktop Comp Forman 77 41 Dr Orse Dr Grago Emergraphica willing Emergraphica willing	144 95 34 95 129 95 200 85 220 85 220 85 220 85 220 85 220 86	Compters C Forton Beec Cotol Fascal Macro Assem Mis Crossali Ramota Norson Ust v 3 Re	Chilities .
Pac wij4s	174.00 PRIN 204.00 424.00 424.00 277.00 277.00 444.00 446.00 446.00 446.00 446.00 446.00 446.00 446.00 446.00 446.00 446.	TERS  Germs SR 10 Germs Sr 15 NEC 2650 NEC 2650 NEC 2650 October 162 October 162 October 162 October 162 October 162 October 163 October 164 Institut Plants	499 95 599 95 644 95 1916 95 142 95 594 95 564 95	Digital Research Dam Correction Committee Dam Contraction Committee Pascalint = Pascalint	144 95 34 95 129 95 200 95 220 95 220 95 170 95 177 96 177 96	Complets C C Fortran Belic Cobol Fascal Macro Assem Also Crossalis Ramota Rentes Norson Ust v 3 Re Prokey v 40 Se Easter Sec-	CATITION OF THE PARTY OF THE PA
Place widds  Place	174.88 PRIN 284.85 424.85 424.85 277.96 384.85 277.96 384.85 446.85 279.96 239.96 239.96	TERS  Genns \$9 to Genns \$9 to Genns \$9 to Genns \$9 to MCC 2600 MCC 2600 MCC 2600 MCC 8600 Ovides 100 Ovides 100 Ovides 64 Toenbe P051	899.95 599.95 644.95 9918.95 1429.95 344.95 509.95 1009.95	Digital Research Dam Corector Cam Desktop Comp Forman 77 41 Dr Orse Dr Grago Emergraphica willing Emergraphica willing	144 95 34 95 129 95 200 95 220 95 220 95 220 95 170 95 179 96 179 96 274 96	Compters C Forton Beec Cotol Fascal Macro Assem Mis Crossali Ramota Norson Ust v 3 Re	CARRIED STORY
Pac wide   Finan MSP 10   Inter MSP 15  Inter MSP 25  Inte	774.88 PRIN 201.88 424.88 424.88 424.88 544.88 279.89 444.88 553.96 553.96 239.96	TERS Genns St 10 Genns St 15 NEC 2600 NEC 8000 N	899.95 599.95 644.95 9918.95 1429.95 344.95 509.95 1009.95	Gara Covening Covenin	144 05 34 05 129 90 209 95 229 95 229 95 229 95 179 95 179 98 274 95 149 95 149 95	Complete C Fortun Seec Cotol Fesci Micro Assert Micro Assert Ferrola Refer Norton UNI v 3 Seese Seec Seec University V 49 Seese Seec V 49 Seese Seec University V 49 Seese V 49 Se	Chilities Count month
Pac wide  Pac wide  Packarn MSP 19  Intern MSP 19  Intern MSP 20  WORD  WORD	PRIORIES 170.00 PRIORIES 170.0	TERS  Genne St 10 Genne St 10 NCC 2600	899.95 599.95 544.95 9918.95 5429.95 364.95 89.95 509.95 1009.95	Gam Covening	144 95 34 95 127 95 209-95 429-95 429-95 179-96 179-96 179-96 149-95 149-95	Complete C C Fortun Seec Cool Facol Facol Macro Assem Mile Conson Rende Mono UN v3 Seec Cool Seec Co	Chilities Count Count Count
Pac wides	774.88 PRIN 201.88 424.88 424.88 424.88 544.88 279.89 444.88 553.96 553.96 239.96	TERS  Genne St 10 Genne St 10 NCC 2600	899.95 599.95 644.95 9918.95 1429.95 344.95 509.95 1009.95	Syman Messach Gen Chelson Gen	144 55 34 85 34 85 34 85 34 85 34 85 37 86 179 86 179 86 179 86 149 86 1	Complete C C Fortan Beac Cook Fascal Fascal March Assert Meter Notice U C A Se Beac Beac U C C C C C C C C C C C C C C C C C C	Utilities seed seed seed seed seed seed seed s
Pac writes  Pac wr	PRIORIES 2000 2000 2000 2000 2000 2000 2000 20	TERS  Genne St 10 Genne St 10 NCC 2600	899.95 599.95 544.95 9918.95 5429.95 364.95 89.95 509.95 1009.95	Syman Messach Gen Chelson Gen	144 55 34 85 127 95 20 95 20 95 20 95 20 95 173 95 174 95 175 95	Complete C Fortan Seec Cook Facol Facol Facol Facol Marco Asser Meter Nono UNI V 3 Pohey v 4 9 Seev Beec UCATIO WARE Solve Ace Fish Peri	onet to
Pac wifes	PRIORIES 2000 2000 2000 2000 2000 2000 2000 20	Genni St 10 MC 2800 MC	209, 05 509,02 644,03 1914,03 1914,03 1914,03 194,03 195,02 1000,05	Grand Management of the Control of t	144 55 34 56 34 56 34 56 34 56 32 56 32 56 32 56 32 56 32 56 34 56 36 36 36 36 36 36 36 36 36 36 36 36 36	Completes C Fortran Beac Cotol Facility	Offices most most
Proceedings of the Control of the Co	PRIN 2016 2016 2016 2016 2016 2016 2016 2016	Gerna St 10 Gerna	209.05 500.05 500.05 644.06 1011.35 142.06 504.05 500.05 1000.05	Game Country of the C	24.65 20.65	Complete Control of Particular Senior Control of	control to the contro
Page wide.  Page w	PRIN 2016 2016 2016 2016 2016 2016 2016 2016	Gerna St to Gerna	209, 05 509,02 644,03 1914,03 1914,03 1914,03 194,03 195,02 1000,05	Symmetry Department of the Control o	140.00 127.00 127.00 129.00 129.00 177.00 140.00 14	Completes Controlled Fortism State Controlled Facial Facia	control to the contro
Proceedings of the Control of the Co	PRIN 2016 2016 2016 2016 2016 2016 2016 2016	Gerna St 10 Gerna	209.05 500.05 500.05 644.06 1011.35 142.06 504.05 500.05 1000.05	GAME (   GAME (   GAME (   GAME (   GAME (   GAME (   GAME (   GAME (   GAME (   GAME (    GAME (    GAME (    GAME (     GAME (      GAME (	24.65 20.65	Complete Control of Particular Senior Control of	Offices most most

766 RT 101 W • PO Bax 772 • Peterborough, NH 03458

800-845-3003

all matas

## In A Pinch? Give QIC The Inch

## We Have the Right Products ... at the Right Prices

### ... Right Now!

Mass Storage at Massive Savings

QIC-01 10, 20, 32 MB Hard Disk Subsystem



This low power Microscience subsystem comes complete with controller, cables, drive, easy instructions. Fits inside your floppy slot Compatible with DOS 20, 21, and 30 without any patches 33 MB half-height with controller, \$1.295 ... 20 MB Drive for the PC AT, \$895. Mounting hardware for Compaq is available. External 10 MB \$695, external 20 QIC-03 300/1200 Boud Modems



Our modems are fully Hayes compatible with features such as low heat dissipation, low power consumption, software volume control for the speaker, and large-scale-integration "Modem on a chip" for high reliability. It also comes with communications software which lets you emulate VT100 or IBM 3101 Half size Internal \$299

QIC-05 Multifunction Card



It gives you more than just added memory. It gives you reliable memory expansion (up to 384K), α serial port, α parallel port, α game port, and a battery back-up clock calendar. Includes RAM disk, print spooler, and clock utilities (The 64K RAM set is only \$15.) With 2 serial ports \$175.

QIC-2020 External Hard Disk with Tape Backup.

QIC-02 10, 20, 60 MB Half-Height Tape Back-up Systems,

tape back-up unit lugs into the back of your floppy controller. It works like a floppy disk so you can use all the DOS file commands such as COPY or DIR. Back-up 10 MB in 15 minutes Our



up 20 MB in 6 minutes You can even do fast image back-up and then file-by-file retrieval. Works on IBM PC, XT or AT. Internal 10 MB 5499, 20 MB 5699, 60 MB 5899. External 10 MB 5675, 20 MB 5875, 60 MB \$995

Graphics Boards

Hercules Color ..... Hercules Compatible, Mono \$199 Color Graphics Card..... \$125 Everex Graphics Edge ..... \$295

Half Size Cards Memory card with

576K IO card with 2 serial ports l parallel port, clock/calender

\$175

\$1499

\$125 Internal Power Supply 135 Watt. 150 Watt. \$115 Expansion Chassis with I/O Slots ... IBM PC. 256K. 2 Drives.....

with two extra I/O slots Comes with cable and a half size host adapter card. 20 MB hard disk with 60 MB tape is only \$2450

MB tape backup unit in a chassis

We Guarantee Satisfaction!

No Risk. All our products corry the manufacturer's warranty. And remember, if for any reason, you are not completely satisfied within 30 days, you can return it for a full refund

> Call Us Today! (408) 942-8086

Telex: 5101002379 QICRCH



Milpitas. Ca 95035



## DISCOUNT COMPUTER CENTERS an established mail order/retail distribution network

DA TEMBS - DELIVERY Was by mendedlery (bits orders delived with 5 days) Add 3h (5" mills by Dat 3h phone, hardine, seatance Call releases. In 2. "day (5" seatence a saig prince) PAMEMEY VAR. It combined thesis, many come personal consider (bits to benessed spits) in the 3h personal personal personal consider (bits to benessed spit and the seatence of the 3h personal pe

Mail Checks, P.O.'s and Inquires to: DCC MAIL ORDER MANAGER 550 DIVISION ST. CAMPBELL, CA 95008 1707 S. BASCOM AVE - CAMPBELL, CA 95008 - (408) 559-8555 717 E. EL CAMINO - SUNNYVALE, CA 96097 - (408) 773-8821 1341 FULTON AVE - SACRAMENTO, CA 95825 - (918) 971-3803 VISIT OUR DISCOUNT SHOWROOMS!

# LASER PRINTERS

The Hewlett-Packard LaserJet no longer stands alone. Five other companies now offer laser-based printers for PCs. And software is ready to teach laser beams to create graphics and typeset quality pages. But technologies for finer and faster images are still developing.

#### BY JOHN DICKINSON

aser printers—the very name evokes images of Star Wars technology, or at least Buck Rogers and his ray guns. Leading the PC printer world in technology, these machines have caused at least as much excitement as the latest PCs and compatibles.

Simply the availability of high-tech printing at an affordable price is enough to generate much of this excitement. Highpriced laser beam printers have been around for several years, but they have figured largely in the more expensive mainframe and minicomputer arenas.

Last year, Hewlett-Packard introduced its Jas. 3,600 LaserJet, leading the way to lower-cost laser-based printers for the PC. The LaserJet features a 300-dot-per-inch (dpi) resolution Canon laser engine, interchangeable font cartridges with a reasonable selection of font styles and sizes, and the ability to print in normal or sideways mode. The LaserJet quickly won the hearts of PC Magazine's editors and the PC user community at large. Support for the Laser-Jet among word processing vendors has been widespread and strong, and today the machine is found as often in corporate of

to aim its products at the PC marketplace. Reviews of laser entrants from many of these companies can be found in the review section of this issue. Since PC Magazine's printer test procedures have remained the same, you can compare the newer models to last year's look at the LaserJet in Volume 3 Number 23.

The glamour of high technology is no longer the only resson lasers are playing such an important role in the PC printer marketplace. Other attractions that have driven the lasers to the forefront include their exceptional speed, quiet operation, ability to accept paper of different weights and surface types, and high-quality text output. Software commands entered via computer or ROM eartidge make it easy computer or ROM eartidge make it easy to the laser printer's versatility. To compute the gualities, our team of reviewers evaluated the newest laser printers, using PC Magazine's standard tests.

One aspect our tests don't adequately cover—aince they are largely oriented toward word processing—is the outstanding graphics abilities of laser printers. Lasers are basically high-resolution dot matrix printers and, as any owner of an Epson or Okidata printer can attest, even an ordi-



nary matrix printer produces credible graphics output. The higher resolution of the laser printers (about two and a half times that of a standard matrix printer) gives their graphic output the kind of quality that puts them up as serious competitors of traditional pen plotters.

So far, this competition has no clear winner While lasers have significant advantages over plotters in some applications, the file-lip pen-scramblers still have the edge in others. Kaner Christian examines some of the issues that will determine the winner of this context, and also looks at the evolving laser-graphics languages such as Adobe's PostScript and QMS's QUIC, in "Lasers Get Graphic."

The Canon name has become universally identified with PC laser printers. This Japanese company's LPB-CX laser engine has been used in most of the laser printers produced to date, starting with the Laser-Jet. That's why all laser printers tend to look the same—the differences between them usually lie undernead the top cover. where each OEM adds the processor and ROM programs that control the engine. Only a few major companies base laser printers on other mechanisms, such as the Ricoh engine used in the QuadLaser.

The mechanical components of Canon engines are derived from the design of the company's hugely successful Personal Copier Cartridge line of copying machines. That mechanism is universally halied among copier and printer users—as well as the laser printer OEMs—as being among the most trouble-free single-shoet paper-handling devices on the office automation scene.

Bill Hars tells you the facts of life about the Canon LPB-CX engine in "The Little Engine That Could." He explains how it works and what makes it different from the seemingly identical Canon copier, then examines some of its advantages and pitfalls. He even calculates its life expectancy—a little-known fact in the world of laser printers, but one on which servicing policy is based.

But lasers are definitely not the last word in high-tech printiers. There are pitfalls to laser printing, including their reliance on delicate and relatively slow mechanisms to rotate the imaging mirror. New thoughts about printing are quickly evolying into real products in high-tech centers

on both sides of the Pacific.
These new technologies include magnetic drums, liquid crystal shutters (LCSs), and light-emitting diodes (LEDs) that, unlike a laser, don't have to move to create an image. Another new approach revives the relatively old idea of thermal printing and applies it in new ways.

printing and applies it in new ways.

Like lasers, most of the new technologies create an image on a rotating drum, transform that image into lines of toner, then fuse the toner onto paper.

Steve Rosenthal takes a look at these budding technologies in "Electro-Optical Printer: Beyond the Cutting Edge"—and speculates about how soon you can find them in your local computer store.

That'll be outie a day!

#### THE LITTLE ENGINE THAT COULD

#### BY BILL HARTS

aser printing technology, once the exclusive province of large-scale data centers, has recently burst upon the personal computer scene. The new laser printers have more than low cost in common: Most are based on the LBP—C—a mechanism, or engine, made by the Canon Corporation that incorporates a compact, low-cost laser scanning system.

As often happens in the PC peripheral business, the LBP-CX engine started life as a completely different product, intended for Canon's laser copier. Laser beam recording requires two mechanisms; one that optically generates an image via a laser beam, and another that electrophotographically prints it. Canon's task force on laser technology had developed a small enough laser scanning system before 1980, but the other part of the process-the mechanism that actually printed the image through electrophotography-needed further refinement before the two could be combined into a copier. Canon's breakthrough was to put this mechanism into a cartridge. The company created the Personal Copier Cartridge, which became the first step toward Canon's popular PC-10/20/25 copiers. In 1980, when Takashi Kitamura, Canon's business division manager, saw the blueprints for the cartridge, he realized that it could be applied to laser printing as well, and from this combination the LBP-CX was born.

Canon decided to market the basic empire to OEMs, who would attach their own interfaces to it and incorporate it into their most produce of the own products. Some companies that have done this already are It welter. Packard designed circuity that convers the data that the computer sends into input that they offer the own prince's raster imager interface can accept. This interface actually has more in common with a CRT monitor than it does with what we usually think of as a printer december of the owner of the owner of the owner owner



Canon's LBP-8 A1 Laser Printer.

The Conor LBP.CV late printer coning a Good park when proposed board of loght. Its laser beam is reflected off the edge of a rolleding polygonal remove through a series of lenses that aim the beam onto a rolling down with a phototer of the printer of the printer of the conor rolleding the printer of the printer of the lases delivers the data for one horizontal layer of dots.



Figure 1: This diagram shows the inner workings of the LBP-CX's mirror-and-laser construction.

#### Common Ground

The way that the actual image is formed is common to all LBP-CX-based printers. A small semiconductor laser emits a pulsating stream of light that is reflected off a specially designed polygonal mirror (see Figure 1). The mirror continually rotates, causing the laser beam to scan the width of the drum and instantly return to the other end when the mirror surface changes Light striking the surface of the drum causes it to acquire an electrical charge that will attract toner chemical. When the drum comes in contact with the paper, it transfers the image through a combination of heat and pressure similar to that found in a standard copying machine.

In fact, the only real difference between the printer and the copier is the process that each uses to generate the final output. The conjer uses a fluorescent light operating at a frequency different from that of the laser light, which means a different chemical process is needed to re-create an image on the paper. This is why cartridges from the Personal Copiers will not work with LBP-CX-based printers. (Jack Strange, Canon's western regional manager, comments, "That's the first question everybody asks: Can I use the cheaper cartridge?") In addition, in the laser printer, the light beam strikes the drum, and the toner adheres to the spots that the light beam hit. In the copier, just the opposite happens: The toner does not stick to the

The Canon engine is capable of printing at a resolution of 300 dpi, or 90,000 dots per square inch. Any way you say it, the resulting image is surprisingly good. Also each OEM that uses the LBP-CX has concentrated on a certain aspect of the printing process, such as text or graphics, and this specialization has contributed to the quality of the individual printers.

places that the light beam hit.

The Imagen Corporation's 8/300 Page Printer, for example, gives a good picture of what the high end of raster imager interfaces can do with the LBP-CX engine. (For examples of laser graphics, see "1-asers Get Graphic" in this issue, I In my opinion, the Apple LaserWriter, which uses Adobe System's PostScript printing language, is one step below the Imagen in quality. Following closely behind are the QMS Smartwriter and the Corona Laser Printer; these can download fors, thereby eliminating the need for extra print cartridges. Next is the Hewlett-Packard Laserlet, capable of a good mix of text and praphics, and finally. Cannor's own Bubble-Jet BJ-80 at the low end of the price scale. Cannor's entry is Diablo 630 compatible, while Hewlett-Packard uses its own very complexe scape-code sequence.

#### Cartridge Care

Since the cartridge contains most of the disposable parts and chemicals in the printer, routine maintenance is very easy. Whenever you change the printing cartridge (after about 3,000 pages), you are also changing the imaging drum and adding toner, the cost is about \$100, all told.

Canon also indicates that some parts may have to be replaced after 100,000 pages have been printed. These parts mainly the paper separator belt and the pa-



Cartridge for the Hewlett-Packard LaserJet

per transport rollers-can only be changed by qualified service personnel. None of the companies that I asked had developed a maintenance plan or even estimated a price for performing these repairs, although every one of them spoke highly of the overall reliability of the mechanism. None reported ever having had to change any of these parts, even on the machines that they used for development and testing. Basically, the LBP-CX mechanism is designed for light- to medium-duty applications that generate approximately 100 pages per day. Assuming a 5-day work week, simple arithmetic tells us that it would take nearly 4 years before printer output approaches 100,000 copies.

Before buying, make sure that the seller or manufacturer is able and willing to service your printer. Canon does not accept service responsibility once the LBP-CX is incorporated into another product.

Canon and most of the OEMs that I spoke to for this article would not release specific sales figures, but I can safely estimate that tens of thousands of LBP-CX-based orinters have already been sold. As

these printers make their way into local area networks and sophisticated word processing systems, the office environment will benefit from the powerful capabilities of this remarkable little machine.

Bill Harts, who reviewed printers for PC Magazine in last year's printer issue, is president of Packaged Solutions, Inc., a New York-based software company.

#### LASERS GET GRAPHIC

#### BY KAARE CHRISTIAN

here's a three-way feud in the computer printing business. Some printers, usually called plotters, are best at drawing lines. Naturally, they produce outstanding line drawings and are heavily used by drafters, architects, and engineers. A more flexible strategy is noisily advanced by the dot matrix crowd. Their idea is to make drawings with dot patterns-a seemingly crazy approach that was first explored by a group of nineteenth-century artists called pointillists. The third approach, which uses fully formed characters, is the oldest-dating back to the invention of the printing press. Obviously it has merit: It's a system that has worked for 5 centuries.

Although this feud has been underway for several decades, a winner is just beginning to emerge. Among the other contestants, the plotter, which uses the line-drawing approach, takes third place. Plotters are too slow, their typography is miserable, and their technology is meistable, and their technology is medically based, Second place goes to the bangilay, fully formed character printer-approach typeset quality or handle graphic—and it, too, is based on mechanical technology.

Dot matrix technology is the clear victor in this dispute. Even so, there's a catch: To make anything look good, you need to have enough dots. Early dot matrix printers for the PC, such as IBM's widely used PC Graphics Printer, suffered from a lack of resolution. Though the PC Graphics Printer proved the flexibility of dot matrix technology by printing both text and graphics, its print qualify was poor. That's where laser printers step in: they're highresolution dot matrix printers that can take over the jobs once done by the two runners-up.

Laser printers aren't new—they're just newly affordable. In the early 1970s, Xe-rox Corporation in Palo Alto, California built one of the first laser printers. Called the XGP for Xerox Graphics Printer, it was distributed to only a handful of universities. The XGP was eventually succeeded by Xerox's legendary Dover, also distributed mainly to universities. You could buy a roundint of PCs for the price of a Dover, but still these cardy models gave Xerox is ending the Xerox is ended to the School of the

Suddenly, in the past year, a virtual supposed in the number of lower-cot laser printers has blown open the market, At present these recent low-cost laser printers, designed for the office environment, act in effect as high-quality typewiter replacements. As their technology soon becomes more developed, capabilities now found on printers costing \$20,000 will be available on \$3.000 machines.

#### Fighting the "Jaggies"

Most impact dot matrix printers face one major drawback: resolution. They just don't put down enough dots to draw a smooth curve or line. One solution to the

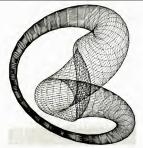


Figure 1: These three-dimensional line drawings were created to help a researcher visualize camplex three-dimensional trigonometric equations. The plots took several hours to compute, but less than a minute ta print. Created by Hans Knutsen on a OMS LaserGrafix 1200.

"jaggies" is to space the dots closer together until the jaggedness vanishes. Many laser printers now have a resolution of 300 dots per inch (dpi)-four times that of a typical impact dot matrix printer; future optical matrix printers will have even higher resolutions.

A less obvious answer to the jaggies is adding more intensity at each point. Going to a gray-scale system instead of using the traditional black/white system that most printers offer gives a smooth, natural appearance to graphics or text formed from dots. But until gray-scale capabilities become available, higher resolution is all that laser printers have to fight the jaggies.

Currently, the highest-resolution output device for the PC is the pen plotter. Units with 1/1,000-inch resolution are sold at a reasonable cost. Plotters that handle large paper and offer multiple pen colors are readily available. Myron Hunt of Hewlett-Packard's plotter division in San Diego. California comments that the PC market for plotters has made enormous gains in large, complicated drawings.



Figure 2: The ability to create fonts in any size or style makes laser printers highly flexible.

the last 2 years. Five years ago, not many plotters were connected to PCs, yet today about 75 percent of the less expensive plotters are sold to be used with personal computers. As recently as 2 years ago, few PC software packages could output to a plotter, while today many graphics packages have plotter support.

Pen plotters are ideal output devices for graphics composed of lines or curves, but are awkward text-output devices because they offer a limited choice of fonts and sizes. Also, images with filled areas take too many lines and too much time, as do

Do these drawbacks hand the laser printer a clear edge over the plotter for line drawings? Not at present. Cheaper price, multiple colors, and the ability to handle large sheets of paper give the plotter formidable advantages. Until laser technology improves, the two will continue to be complementary products.

Roger Archibald of Hewlett-Packard's office printers marketing group shares a similar perspective. He, too, believes that these advantages will keep plotters plotting even as the more flexible laser approach wins most other battles. Though laser printers are not yet a cost-effective alternative to plotters, they are in the midst of a price/performance revolution, whereas plotters are a mature product line

According to Archibald, Hewlett-Packard is careful to keep from getting too far ahead of the user by marketing technologies too new to be immediately used. Laser printers are an especially risky venture. since they may compete with some of the company's existing products.

#### **Dot Matrix Duel**

Laser printers could change the way PCs are used by bringing high-quality graphics output to the PC. Like the plotter, a laser printer can draw smooth lines and arcs, and fill large areas easily (see Figure 1). The ability to create fonts in any size and style makes it an ideal text output device (see Figure 2). Although sending a picture to a laser printer can take some time, the actual printing is very fast.

Perhaps the easiest way to understand the limitations and capabilities of laser printers is by comparing them with the more familiar impact dot matrix printers. On any dot matrix printer, text and graphics are actually formed from dots. Impact dot matrix printers designed for graphics applications allow each dot to be individually controlled through a process called All Points Addressable (APA) graphics. In most APA-style dot matrix printers, such as the Epson MX-80, images are drawn by sending a bit pattern to the printer that tells it exactly which dots to print.

A dot matrix printer can handle APA graphics without using a lot of printer memory. Having the printhead pause and wait for the host computer to send it the hitpattern data saves the impact dot matrix printer from storing a bit pattern for an entire page. Most dot matrix printers contain a processor and some memory to control the mechanical print elements, but these embedded "smarts" are rudimentary.

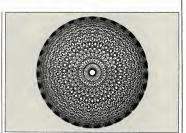
On a laser printer, however, the mechanical constraints are completely different. The laser and the drum both move at a constant speed as the laser scans out the image. (For a more detailed explanation of the laser printer's workings, see "The Little Engine That Could" in this issue.) Once a print cycle starts and the drum starts to rotate, there's no pausing: The full page of text or the whole graphics bit pattern must be in the printer's memory before the drum starts to rotate. And that can take a lot of bits! With Canon's LBP-CX engine, which has a 300-dpi resolution, an 81/2- by 11-inch page works out to 2,550 by 3,300 addressable points, or about 1 million bytes of memory. While main memory may be cheap, it's still hard to make an affordable peripheral with a megabyte of memory! However, there are ways to get around the large memory requirement. Laser printers that don't have a full page of graphics memory can still print a full page of graphics, but at lower resolution. A full page takes just a quarter megabyte at 150 dpi, and less than 64K at 75 dpi-a resolution similar to that of many traditional dot matrix printers. Another alternative keeps the high-resolution graphics, but limits it to less than a full page. Most memory-poor laser printers usually have both these options built in.

#### A Soft Solution

For dot matrix technology to work seamlessly, you must have an enormous number of dots. The problem is that when you have enough dots, the huge mass of information becomes hard to manage.

The solution is software designed to translate higher-level object descriptions into internal bit patterns. You may already be familiar with this idea from impact printers like the MX-80. When you ask for a letter A, for example, it automatically looks up that letter's bit pattern and prints it on the paper. A similar translation occurs as a software-cuippoed laser printer.

With the right software, laser printers



Laser printers cure the "jaggles" by creating high-resolution images.

can do the work of plotters. For instance, you can send your laser printer a series of vector drawing commands and let the printer's internal software translate each line segment into a dot pattern that depicts the desired line. However, if lawer printers graphics, they also need more cophistical edoptocessing power. Several laser printers now use Motorola's powerful 68000 processor, making them in effect more powerful than the machines sending them the data.

Speaking of Languages (1) the LaserGraft's printers (QMS, Mobile, Albamil s an example of just such an inter-output and APA bit-map graphics, QUIC contains commands for drawing lines, boxes, and bar codes. The QUIC code for a box in ±180-250011000020079—all told, about 21 bytes. If the same command that the process of the printer of t

Another advantage of using higher-level commands for graphics is standardization. Given suitable higher-level graphics descriptions, it's possible to create fam-

ilies of products with various price/performance levels that all accept essentially the same graphics input.

Xerox, among the first to develop practical laser printers, was also the first to develop a graphics language specifically for laser printing. The company's experience with early laser printers made it obvious that its applications software should not depend on specific laser printers. In response, Xerox developed Press format-a standardized way of controlling a laser printer. The idea was to have applications programs create Press format files, then have individual printer driver programs translate the Press format data into control codes for that particular laser printer. Xerox's current laser printer control language is called Interpress, and it is used on the company's 8044, 2700, and 5700 laser printers.

Perhaps the most important offshoot of Kerox's software method—a page-description tanguage called PostScript—has been created by the Adobe Corporation in Palo Alto, California. QMS, Apple, and Merganthaler have all signed agreements with Adobe to make PostScript available on their laser printers. This makes Post-Script a leading candidate for a universal laser printer page-description language. PostScript is an interesting tool be-PostScript is an interesting tool because, like BASIC, it's an interactive programming language. The difference is that PostScript is specifically designed for controlling laser printers. Applications programs typically generate a PostScript program, then send it to a laser printer that contains PostScript interpreter software. The printer runs the PostScript program and prints the output.

Like BASIC, PostScript contains key words that mark the main features of the language. In PostScript, however, a program can redefine most of the key words. For instance, the PostScript key word MO-VETO is obviously used to change the print position. Using key-word redefinition, a PostScript program could redefine MOVETO, directing graphics to print with, say, an offset in the vertical position to accommodate odd-sized paper.

Good graphics software is designed to he used with various output devices. The first round of graphics programs for the PC were often severely limited, and many could only output to IBM's Graphics Printer. Eventually the software vendors started to provide a greater selection of output choices, and today many graphics programs contain support for several plotters and numerous dot matrix printers. As laser printers that handle graphics become cheaper, applications software will evolve to support them. PostScript is the early leader, but other systems of transmitting graphics information to laser printers may very well come into the limelight.

As laser printer vendors struggle in the coming "features wars," graphics will play an important role. With the decreasing cost of memory and the increasing graphics sophistication of PC software, more companies will try to distinguish their products by adding useful graphics capabilities-and, in the process, enlarging the PC software base to accommodate this new technology.

Kaare Christian, a frequent contributor to PC Magazine, typeset his forthcoming book on Modula-2 on a laser printer.

LED printers, like laser models, are basically photocopy machines, except that the original input is an electronically controlled pattern of light rather than a visible sheet of paper. Rather than having a single laser beam to scan the individual dots in each line of an image, LED printers use an array of tiny semiconductor light sources to create an entire line of dots at one time. (Actually, laser printers use LED lasers also, but in printing technology only the arrays of nonlasing light sources are referred to as LEDs.)

As with a laser printer or an office photocopier, once the light beam carrying the image strikes the sensitized printing drum, it knocks off tiny charges leaving only the charged areas to pick up toner. The toner is then rolled onto a piece of paper and fused in place through a combination of heat and pressure. The big advantage of using an LED array is that it retains the mechanisms and technology that proved so successful in laser printers vet does not require a precision spinning mirror and extra alignment to keep the laser on course. Moreover, LED arrays can be assembled with production methods similar to those used for hybrid circuits or circuit boards, keeping their cost low.

#### ELECTRO-OPTICAL PRINTERS: BEYOND THE CUITING EDGE

BY STEVE ROSENTHAL

uilding a better mousetrap isn't enough: Even if the world beats a path to your gate, you won't be able to sell your product unless you can get it out the door. Developers of printers using new technology are finding that the road from design to delivery can take longer than they thought. While several technologies offering alternatives to laser beam printers currently in the sample or development stages have projected delivery dates for fall of 1985, most are unlikely to gain a significant market share before year end. However, buying decisions being made now-especially for equipment like printers, which have a multiyear lifespanmust take into account choices likely to become available in the future

Maintaining an Image Of all the alternative technologies for putting words and images on paper, LED (light-emitting diode) and LCS (liquid crystal shutter) printers are the closest to commercial viability. In fact, the difficulty of grabbing a significant share of the market away from their laser-based cousins is what's holding back the marketing of these new electro-optical printers, rather than any technical obstacle. Facing competition against laser printers, several firms that were ready to go to market have instead gone back to the lab to raise performance or lower prices. In the meantime, work continues on more-esoteric printing alternatives (see Figure 1). Borrowing from the fields of magnetism, thermal dynamics, ion electricity, optics, and electrical erosion, these state-of-the-art models could radically change printing for PC users.

#### LED Models

NEC Information Systems of Boxboro, Massachusetts expects to have an LED model out in late 1985 for less than \$4,000. With an 8-page-per-minute printing speed and a 300-dpi resolution, it should compete directly with laser printers that use the popular Canon LBP-CX mechanism (see "The Little Engine That Could" in this issue). NEC's basic model will be text oriented, but an optional 1-megabyte memory will allow full-page graphics. Besides such features as three built-in fonts, serial and parallel ports, and a small footprint, NEC's printer is shock-resistant and relatively light-which helps when you need to move it around the office. However, at just over 50 pounds, many people will still need a hand (or some practice time in the company gym) to get it from desk to desk.

If you need to choose a printer right now, Kentek Information Systems in Allendale. New Jersey, has an LED printer that turns out 12 pages per minute with 240 by 240 dpi resolution, uses a 68000 processor for full-page dot graphics in the all-points-addressable (APA) mode, and has a built-in 5%-inch disk drive. As many as 30 fonts can be stored on a disk, and the tabletop unit can also accept downloadable character sets over an RS-232 or RS-432

Kentek admits that, at close to a \$9,000 list price, this machine is more suited to group rather than individual use. But to maintain its full printing rate of up to 12,000 pages per month, you'd need several people to be not better a province.

eral people to keep it busy anyway.
Incidentally, you won't find someone
else's printer engine in the Kentek,
machine—Kentek, went so far as to set up a
complete subsidiary in Japan, bypassing
the international electronics glants, brate
gives the firm access to the advantages oftered by Japanese component manufacture
era without having to pay the large markuin
that is customarily added by a trailing
house. A Kentek spokesperson says its
printer is available now.

#### Liquid Crystal Clear

Liquid crystal displays (LCDs) have taken a major share of the market for calculators and watches away from LEDs, and several firms think they can do the same with printers. By building on top of the money and talent that has already gone into making LCDs, liquid crystal shutter adherents think they can produce a better printer than the competing LED-array or laserbased models.

A liquid crystal shutter (LCS) works just like a liquid crystal display, but the electronically controlled panel blocks or transmits light, which is then focused on the print drum rather than forming a viewable image on the LCD. Once the image gets to the drum, the printer's operations will be the same.

Casio Computer Company in Fairfield, New Jersey claims to have started selling an LCS-based printer mechanism to DEMs in May of 1985, which should lead to a rash of printer announcements this fall. Called the LCS 2400, its mechanism has a resolution of 240 dpi, one or two 250-page paper stackers, and a switchable color capability (hough only one color can be printed at a time). Casio won't reveal OEM prices, but it expects volume buyers to be able to build a LCS 2400-based printer for less than \$3,000.

Epson America of Tornance, California, is the acknowledged leader in Poclass printer sales. The firm went so far as to send our press releases about its LCS printer and demonstrated the model in late 1984. However, Epson's original model came out several months later than the Canon LBP-CX mechanism and was slightly higher in price. Rather than fighting that battle, Epson decided to hot off for a few months and finish development on its second-generation model.

Epson's second-generation LCS models will probably have color, higher resolution, greater speed, and better price/promance ratios. Release dates have not been set, but the end of 1985 would be a reasonable guess.

#### Printing with Magnetism

If you're trying to convert electronic patterns to dots of toner, light waves are not the only route to take. Magnetic printers that write the dot patterns magnetically and pick up toner with a slight iron content offer several advantages that the optical approaches do not.

So far, Ferix Corporation of Preemont, California is the only firm showing a magnetic printer for PC use. Its magnetic printer for expectation of the companies of the companies

Unless erased, the magnetic patterns written on the film stay in place even after the toner has been transferred to the paper. If you need multiple copies, a magnetic printer can run off several pages from the same magnetic pattern. Eventually the image does degrade, but it should last for at least several dozen copies.

Perhaps just as important, the magnetic patterns are self-storing. Without requiring large amounts of expensive semiconductor memory to hold a bit pattern while an image is being written, a magnetic printer can simply lay down dots on the drum as if it



photoconductive drum by bouncing the

beam off a precision rotating mirror.



With an LED printer, the light that forms the image on the drum is created by a fixed array of closely spaced lightemitting diodes.



Liquid crystal shutter printers use an electronically controlled screen to block light or allow it to reach the surface of the photoconductive drum.



Magnet printers use a head that slides over the drum to write the image as a magnetic pattern. Note that the image is printed horizontally.

The four most-current methods of electronic printing differ in how they prepare the printing drum for the toner. were a large section of memory addressed scrially dot by 0x. An image too complex to be created in a single pass can be constructed in several layers. Ferrix's first model, already in the hands of potential OEMs, lays down 240 dots per inch. However, a 240-by 480-dot resolution should be available in late 1985, followed by 480-by 480-dot model. Magnetic dots, Ferrix claims, are sharper than those created by laser printers, allowing lines as thin

as a single dot in width. If you're willing to let the tail wag the dog, you can get high-volume magnetic printers from Cynthia Peripherals in Sunnyvale, California. Cynthia's MP6050 can be delivered to your door for a mere \$30,000 (just over half that if you buy in volume). But once you get it hooked up, it can churn out 50 pages per minute (the more expensive 6090 does 90). These printers run through paper so quickly that the firm offers a special splicing tape to join boxes of continuous paper together. That way, you don't even have to stop every couple thousand sheets to change paper. Rated life on the printer is 1 million pages, or about ten times the total output that is offered by the typical desktop laser model.

#### Ion Age Printing

Returning to electrostatics as a method of putting toner on a drum, charge patterns can be written directly by bombarding a print drum with charged particles rather than knocking off charges with light. That's what ion printers do, but so far they only do it for high-volume applications. Typically units from such firms as Delphax, Anser Technology, American Computer Hardware, Miltope, and Paradyne require a mainframe-like interface and run at 50 to 100 pages per minute. They also cost tens of thousands of dollars, which is unfortunate because ionography looks like it could suit the needs of PC users. Since the ion drum can be a hard steel surface rather than a soft photoconductive drum used in the various optical methods, it doesn't have to be replaced every few thousand copies. The few moving parts are almost all simple rotating cylinders, helping to make repairs an infrequent disruption. And instead of using a separate hot

roller, the toner can be fused with cold pressure against the steel image drum. Cold rolling takes less power and requires

no warm-up time. Perhaps ion models will make the same

While it might seem

that thermal printing

is slow and gross, the success of

thermal printers

shows that heat is

hard to beat.

transition from Jarge, mainframe-oriented machinery to desktop printers that laser printers did. For now, if you're a commercial-forms vendor for an organization that needs endless forms in triplicate, you might want to look into this technology immediately. Ordinary PC users will have to wait.

#### Some Like It Hot While it might seem that thermal print-

ing techniques are slow, inefficient, and gross compared to laser light and direct electronic creation of magnetic fields, the success of themsel printers shows that heat is still hard to beat. Teaming heat up with magnetic or optical technology may provide an inexpensive yet high-performance printing alternative. That's what the Buropean electronics giant Philips GmbH in Hamburg, West Germany is claiming, at least in published reports of its research efforts.

Philips's thermal-magnetic-optical bybrid process works rather indirectly, but because there are no moving parts, the Rube Goldberg flavor of the scheme doesn't decrease the reliability or raise manufacturing costs. Here's how it goes: Electronic signals control the heating of tiny areas of magnetic material that have been formed into long narrow shutters. By heating these areas past the Curie joint—

the temperature at which magnetic properties change—dost at densities greater than 300 dpi can be rapidly switched from a magnetized to a demagnetized state. The change in magnetism, in turn, affects polarized light passing through the shuter, which blocks or passes light. The light exposes the drum, which is the part of the printer that picks up the toora and fuses it

to the paper.

So far, Philips hasn't announced any specific products based on this hybrid approach, but given the dizzying speed at which other thermal technologies have the other thermal technologies have the activation of the product of the pr

#### Erosion Control

Although many of these new technologies promise the same "near typeset quality" claimed by proponents of laser technology, a careful look at a page printed at even 300 dpi will reveal the tiny dots making up each character. But you'll have to get out a magnifying glass if you want to see the dots in characters and images produced by IBM's 4250 Printer. This \$21,000 electro-erosion model lays down dots at 600 doi. So far, it has been used mainly by typesetting and forms-printing companies. Passing a current through a set of fine electrodes that slide along aluminized paper, the printer vaporizes the shiny coating on the paper to reveal a black background. You wouldn't want to use that paper for office memos, but it makes highquality master material for photo-offset

printing.
Unfortunately, like other advanced printers, the 4250 can't really do the field of PC printers full justice. But these models show the direction that printer technology is taking.

Steve Rosenthal has put in time setting type, running presses, and fixing typewriters. He now writes for several computer magazines and helps produce a TV show. Introducing Fujitsu's newest 24-wire printer.

## At last, the IBM PC has an equal partner.



Now you can get one dot matrix printer that matches the power and versatility of the IBM PC. The Fujitsu DotMax 24.

It can handle the same powerful business programs—like Lotus 1-2-3," Symphony" and Framework." And with its advanced 24-wire

And with its advanced 24-wire technology, the DotMax 24 will do justice to whatever you and your PC create.

For formal correspondence, switch it to letter quality mode. The printing is so clean, clear and professional, everyone will think you used a daisywheel. If you use graphs, line and pie

If you use graphs, line and pie charts to get your point across, get the color version of the DotMax 24. Its superior 24-bit or 8-bit image modes and eight vivid colors give you plotter quality without the extra cost.

The DotMax 24 is always fast, but shift to draft mode and it's the fastest 24-wire dot matrix printer available. It produces 288 characters per second or about 2½ pages a minute.

And when you get a Fujitsu
DotMax 24, you also get the support
of a company that's known throughout
the world for the quality and reliability
of its products.

So if your company wants to use the IBM PC to create perfect business letters, lengthy financial reports and eye-catching graphics, make sure you have a printer that's equal to the task. The Pujitsu DotMax 24.

Call (800) 626-4686 for the Fujitsu distributor nearest you. For maximum quality and maximum value, get Fujitsu Printers.

#### FUJITSU AMERICA, INC.



Framework statement of Ashten Tale
Lobis 12 3 and Symphony Indometria of Lobis Development Core
© Figitbu América, Inc. 1985 All rights reserved

CIRCLE 316 ON READER SERVICE CARD

## **AMAZING DAISY**

#### NOW! FULL SIZE, FULL FEATURE, LETTER QUALITY AT ONLY \$353

If you have been searching for a letter quality printer you probly found that the flood of claims and counterclaims. We have a construction of the control o

THE RESULTS ARE IN

We found the printer which has all the features anyone could want. We've named it the Aprotek Daisy 1120, a real heavy-duty workhorse printing at 20 characters per second. The manufacturer is Olympic Co. Ltd., a highly respected

FEATURES GALORE This printer has it all. To start with, it has a front control panel with indicators for Pitch Selection which allows for 10, for Pitch Selection which allows for 10, 20 of 15 character per inch (EP) or 12, or 15 character per inch (EP) or 12, or 15 character per inch (EP) or 12, or 15 character per inch (EP) o

2K buffer allows a page or two of con-current printing and use of your com-puter for the next job. To really take ad-vantage of your printer's optional features, the automatic Cut Sheet Feeder eliminates tiresome paper handling. Also available is the adjustable Tractor Feed option. Compare our option prices! Best of all the Dalsy 1720 is quet: only 57 dB-h (compare with an average of 62-65 dB-h for others).

COMPLETE COMPATIBILITY The Daisy 1120 uses industry standard Diablo® compatible printwheels. Scores of typeface styles are available at most computer or stationary stores. You can pop in a 10, 12, 15 pitch or proportional printwheel and use paper as wide as 14". At 15 CPI you can print 165 columns—a

At 13 CP1 you can print 10s columns—a must for spreads, buests. The Daty 1120 uses the Table 119 the 19 the

Word\* and most others. This allows you to automatically use superscripts, subscripts, automatic underlining, bold-face (shadow printing) and doublestrike. The printer has a set of rear switches which allow the use of standard ASCII as well as foreign character printwheels. Page length can be set to 8, 11, 12, or 15°. The Daisy 1120 can also be switched to add automatic time feed if required to add automatic time feed if required.

THE BEST PART

THE BEST PART
When pricing a daisy wheel printer
with all these features (if you could find
one), you would expect to pay \$600 or
\$700 dollars. The options would add
much more, but our exhaustive research
has paid off for you the PC user. We can
Order yours today!
NO RISK OFFER

Try the Daisy 1120 for 2 weeks. If you are not satisfied for ANY reason we will refund the full price—promptly. A full 1-year parts and labor warranty is included. Another indication of quality and reliability.

THE BOTTOM LINE Aprotek Daisy 1120 (Order#1120) \$353 wistandard Centronics parallel interface

Options Auto Cut Sheet Feeder (#1110) \$188

Tractor Feed (#1112) \$77 Accessories 8 ft. Shielded Cable for IBM PC\* and

Ask about cables and interfaces for other

Computers.

Shaperin is \$11—UPS continental USA. If you are in a hurry, UPS Blue or Are Parcel Post (second day any in \$25C. Canada. Alabak. Person and Fissali are residents and 65% tax. Pinces are cash proces—VISA and MC add 35% to total. We ship promptly on money orders, cashier's checks, and charge cards. Allow 14-6ay fearing for checks, No C.O.D.; Pay-

(8-8 PST) (800) 962-3800 CALIF.





## PRINTER UTILITIES

If your printer's output looks laid back instead of perked up, the solution may be a printer utility program. PC Magazine looks at 12 software programs that make your printer perform the wonders it was designed for—from special typefaces to sideways printing.

#### BY ALFRED POOR

Brathless with anticipation, you bring home the fig white host from the neighborhood computer store. Visions of the wonderful works you'r going to create with your brand new Acme White-Bang dot markix printer dance in your head. The salesman showed you the Todden of the Control of the Contr

Instantly, disappointment sets in. All the printer will produce is basic draft quality output. You peer into the manual, only to be confronted by tables of hexadecimal numbers and undecipherable codes like SI and SO. You begin to feel like a dumbfounded kid in a Cabban Wilson cartoon.

Where have you gone wrong? If you can't even get at the printer's different

fonts, how are you ever going to get beautiful graphics like the ones you saw in the store demo?

All is not lost. You don't need a Ph.D. in computer science to get the most out of your printer. Many word processing promains are equipped to send the proper codes for most major printers (and most of the minor brands institute the more popular models). But this does little to help you with your spreadheets and databate reports. Some models let you put in "printer institutization strings," but then you'tre apparent to the proper some models let you put in "printer institutization straings," but then you'tre apparent some models and the printing out graphics is another matter.

What you need is a program that does the worrying for you: You tell it what typeface you want, and it knows how to notify the printer. Printer utility programs, which fall in three basic categories according to the level of sophistication, do just that.

At the simplest level is the type that sets the printer to a specific font, using parameters already built into the printer. They

don't let you change the font in the middle of the report; you just set it and forget it. These programs are often referred to as "printer configuration" programs, since all they do is set the printer to the desired font parameters.

With many of these simple programs, not be unit many of the application. The major problem with this approach is that some programs send a rest signal to the prifter as they load—a procedure that effectively wipes out the work done by the configuration program and leaves you printing in the default fout.

Other configuration utilities, like Side-Kick, reside in memory, and you can call them up while in another program to set up the printer. These programs have the added advantage of letting you change the settings from one document to another, although you still can't change settings midstream.

At the next level are utility programs that let you use either the printer's native fosts or the program's more artistic and distinctive fonts. If your printer supports this feature, you may download these fonts into the memory of your printer. Other programs of this type simply translate the letters sent by your computer into small graphic images, the fonts are printed by the graphics mode on your printer. (You don't need to know that the printer is using a graphic mode. The red result is the same: the printer just prints out the same the printer printer is printed by the printer printer printer is printer to the printer printer printer in the printer printer printer printer is printer to the printer pri

The 90 Degree Solution

One particular category of special fonts turns each character 90 degrees so that your report prints sideways on the page. This option is especially handy for printing wide spreadsheets; the Sideways program was created solely for this purpose. As you will see from the mini-reviews that follow, a number of other programs now offer sim-

ilar facilities that include other features as

well.

At the highest level, the benter fout utility programs do more than just set your
printer. They also control the printous or
your document. Embedded commands
signal when to change forms and printing
parameters, yielding near typeset-quality
documents. Unfortunately, getting
quality output often requires the printer to
make many passes for each line to printer
to be prepared to see your speedy dot matrix
slow to a craw.

and to a crawi.

The theoretical line dividing a font utility program from a text-oriented graphics
program can seem pretty fazzy when you
look at it closely, so we also reviewed a
mandoone characteristic control of the control
and concentration of the control
and contro

programs can help you do a good job in a shorter time.

A Representative Sample

If you've ever thought that there must be an easier way to unlock the secrets of a dot matrix printer than by deciphering the mysterious charts in the manual, you are right: a printer utility program may hold the key. The 12 mini-reviews that follow tell you what happened when we tried out a representative sample of what's on the

market. Our goal was not to be exhaustive but to introduce you to printer utility programs in general by illustrating some of the high (and low) points of the packages we sampled. They range from simple utilities that don't really do much to others that give you a whole graphics department in your keyboard. Each has its value, and one may just give you the results you dreamed of when you first occened that big white box.

## "We need Bob's spreadsheet in our report. NOW!"



NCR Corporation, Personal Computer Division, World Headquarters, Dayton, OH 45479. (513) 445-7478. For a dealer near you call 1-906-947-3800. In Nebraska 1-900-331-1000.

#### Adapta-Print

Even though Adapta-Print is simply a printer configuration utility, it does have some features that set it apart from its competitors. Unlike most of them, it is memory resident, so you only have to load it once and then you can go ahead with your application.

When you want to change the print settings for your printer, all you have to do is simply press a pair of keys to bring up a menu of font options. You select the feat mers you want and then go back to your program. Since the utility is always available for use in memory, you can able for use in memory, you can change the settings between printous. This also belps you get around the problem posed by programs that reset the printer before they start.

Of course, any print enhancement that

you select has to be used throughout the entire document. This program will be useful for database reports and spreadtheet princuts but might prove to be a little thin for word processing. You may be able to use it in conjunction with the formatting abilities of your word processor, however, be forewarned that some settings interact in unexpected ways. Speaking of unexpected interactions, I had a but of trouble process interactions, I had a but of trouble words and the programs.

Sideways Printing

Adapta-Print offers an optional sideways print feature that enables you to print wide spreadsheets or database reports down the length of the page. For some users such as those who use wide spreadsheets, this feature alone may make it worth its price. You are able to easily switch back and forth between regular and sideways printing without leaving your spreadsheet.

Don't expect much more from Adapta-Print than that it allows you access to the printer's built-in fonts and that it always be ready to answer your call. Except for the sideways option, it does little more. —Jim Forney

## Adapta-Print

Comp-Sy, Inc. 1900 N. Winston Rd.

graphics printers.

Knoxville, TN 37919 (615) 693-0551 List Price: Adapta-Print only, \$65; with

turn option, \$89

Requires: 30K RAM more than the OS
and resident programs, DOS 2.0 or later.
For use with most IBM PC-compatible

CIRCLE 630 ON READER SERVICE CARD

NCR's new PC2PC™ allows valuable information to spread rapidly throughout your office. PC to PC. Without the tedious, error-ridden task of rekeying documents.

PC2PC inexpensively puts up to 64 IBMcompatibles on-line to one another NCR to IBM to Compaq. And that lets every connected PC share spreadsheets, files and databases. PC2PC also lets you use fewer periph-

erals more efficiently by giving every PC in your office access to all your printers, plotters, storage devices, and more.

Get your PCs talking with new PC2PC. You'll see increased productivity from day one. We'll bet you. Dollars to doughnuts.



Your PC to PC Connection.

EXACTLY WHAT YOU'D EXPECT FROM NCR.
CIRCLE 165 ON READER SERVICE CARD



PC2PC is a trademark of NCR Corporation © 1985 NCR Corporation

#### Facelift

It may come as a surprise, but some interpretive BASIC programs are still out there on the market; Facelifi is one of them. Facelifi is actually a simple, straightforward pair of programs that set the native fonts on either your Epson "X" series printer or your Epson LQ1500. The MS-DOS version contains four unprotected files: a pair for the IBM PC family and another pair for compatibles.

To run the program on an IBM with an Epson FX printer, simply type BASIC XPC. After Faceliff displays the title screen, it reminds you to turn on the printer. (If it is not on, you'll get at Device Time-tree of the printer of the p

and so you can set the printer only one way at a time, you can't change features in the middle of a document. In fact, the manual warrs you not to use the print format enhancements of your word processor when the printer has been set with Facelift, because the commands may conflict and "cause other than expected results." Instead, the manual suggests that you divide the document into a manual years after the document into a manual years are required to make each one use a single format the same of the property of the pro

Working with Facelift involves a few

Requires: 6K RAM more than the OS and

resident programs, DOS 1.0 or higher,

BASIC or BASICA. For use with most

CIRCLE 629 ON READER SERVICE CARD

other annoyances. One minor vexation is that the screen clears each time you make a selection—a distraction but not an awful one. A more major complaint is what the program and manual make up their own manes for some of the Epoor for features. For example, "compressed" is remarked comes, "the program and manual make up their own comes "the "app". Novice users will also have a hard time finding, "Babyface" or "Trimline" itseld in their Epon manual if they want to find out how these fonts are created.

The manual has a few problems of its own. It includes no screen shots to guide

FancyFont does an excellent job of giving

you access to a variety
of fonts, along with a
myriad of text-

formatting options.

you, but some bold text shows keystrokes and gives further information. However, the instructions suffer from typographical errors, some of which have confusing consequences. For example, the instructions direct you to use a file called LPC.BAS, then tell you to make a backup copy of the file with the command

COPY A: LPC. BAS B: LPB. BAS
which makes the program difficult to use
because it changes the filename. Other errors, such as referring to BASIC for IBM
compatibles when the program is often
named GWBASIC, may confuse users.
Confusion also arises because the same
manual serves for IBM PC, IBM compatibles, CPIM machines, Epson QX-10, and
the Apple II series.

On the other hand, the manual lists examples of every possible combination of features that the different printers can produce. This makes it easy to find the effect you want and then select the appropriate options.

Facelift works as advertised, in an un-

spectacular way, relying on BASIC. Though it suffers from the same problems as do many others of this type—no defense against printer reset as you start your main application—it is the no-frills choice of the programs in this group.—Alfred Poor

#### Softype

Softyse is an easy-to-learn primer utility with printer initialization, a notepad, and cut-and-paste features for Epson, Okidata, and Star Micronics printers. It is memory resistent and runs with such popular programs as Wordsfar and SideKick. One of the nicest features of this utility is its ability to define a different keystroke combination for calling it up, which avoids connites with other programs.

In addition to an edit or composition mode, Softype provides a type-writer and a forms mode. Anything written in the type-writer mode is held until you enter a carriage return, and then it is sent to the printer. In forms mode you can print on your own stationery or order forms. This feature can be extremely useful when it is used in conjunction with the cut-and-paste facility. Cut-and-paste lets you copy information from your screen and sext it on the

program's notepad.

Print characteristics are controlled through the set-font option. However, the program leaves your settings intact. So after you send off a quick memo in letter quality mode, you have to reset the printer if you want to use a draft font for your spreadsheet.

This program is not completely bug

#### A TABLE

Softype Photon Software 14021 N. E. 8th St

Bellevue, WA 98007 (206) 641-8411

List Price: \$69

Requires: 35K RAM more than the OS and resident programs, DOS 1.0 or later, MS-DOS 1.25. For use with most IBM PCcompatible printers and plotters.

CIRCLE 628 ON READER SERVICE CARD

#### 222

Facelift

Companion Software, Inc.

IBM PC-compatible printers

Los Angeles, CA 90048

P.O. Box 480741

(213) 462-2759

List Price: \$29.95

free. After initializing the printer for double-strike and emphasized print, Softype claimed there was a printer error after outputting the first line. None of the other programs tested choked on line 1.

You can find a number of undocumented commands when in the edit mode. For example, Ctrl-N causes characters to be printed double width, and Ctrl-I causes the cursor to indent and the printer to force a form feed.

Softype uses five function keys. F1 and F2 are identical helps screens; the only difference is the point at which they come up. The F1 help screen is locked on a list of available keys, and the F2 screen is locked on the composition screen. You can seroll both screens to get other help information. The F3 key controls the cut-and-pairs for ture, the F9 key scrolls down ten lines in the composition screen, and the F10 key selects the placement of the Softype win.

In spite of its quirks, Softype is a reasonable investment, especially when you consider its 569 price tag. The program gives you a bundle of easy-to-use features, almost any one of which is worth the price.—Vincent Puella

#### Fancy Font 2.2

One of the acid tests in this business is whether or not the software publisher actually uses its own product. SideKick, for example, evidently grew from a batch of utiities that Borland programmers wrote for

#### Fancy Font 2.2

SoftCraft Inc. 222 State St., #400 Madison, WI 53703 (608) 257-3300 (800) 351-0500

List Price: \$180 Requires: 128K RAM, DOS 1.x or later.

For use with all Epson and Toshiba printers, Okidata MF and FX series with Plug 'n' Play option.

CIFICLE 625 ON READER SERVICE CARD Internal 20 Meg \$599 External 20 Meg \$749





The affordable PC20 hand disk system is one of the most IBM compatible setup around—you'll be able to boot liverely from the quiet, 3:1/2 in. drive. This highly reliable and rugged drive uses plated media. Our free software led you out the most out of your hard poperation and frees you from the intrincates of DOS commands. And our exclusive 3:1/4 in. controller fits into a thort self-perfect for computers like the Teachy 1000, Penasonic Sr. Partner, and IBM controller, and the perfect of the perf

CIRCLE 300 ON READER SERVICE CARD

HR31 200 RGB Color (.31mm) Monitor \$399



Assembling your dream machine? Start with a high resolution (.31mm dof pitch-28% finer than IBMe? RGB monitor at a price hundreds less than Princeton's. A black matrix picture tube (large 14 m. diagonal) provides for brilliant colors and reduces screen qlare. HR31 200 plugs into an IBM color/graphics adapter (640 x 200) card. And you'll pay no extra for our tilt and swivel base.

**QUBIE** 

Inside California (805) 987-9741 Outside California (800) 821-4479

223

themselves. Like Borland's crew, the people at SoftCraft have put their product, Fancy Font, to extensive use: They not only produce their own ads with the program, but they have even designed the

package's documentation with it.

SoftCraft's confidence in Fancy Font is well founded: the program does an excellent job of giving you access to a variety of fonts, along with a myriad of text-formatting options. It does its magic in two stages. First, you must use a text editor (or a word processor capable of creating straight ASCII files) to create the text and embed backslash commands that control fonts and formatting. Second, you save the file, then call it up through the run-off program, PFONT. Fancy Font lets you specify information-such as the file, fonts to be used, and more-in the command line: otherwise, you may let PFONT prompt you for the parameters, although its assistance in this case in minimal.

If it sounds complex, you're right. A 200-page user manual explains each of the different embedded and run-off commands. Fancy Fant takes some time to learn, and since it has only one sample file and no tutorial, you'll find that you have to

experiment a hit Experimenting takes some time at first. at least until you learn to use the draft print command. There's no way to preview the results on screen, and so you must print out all of your experiments. I set up a letterhead example, and it took 1 minute and 45 seconds to print the five lines of text. It can take so long because for special work. Fancy Font often requires six or more passes to print a single line of text. When I specified the roughest draft mode, the same sample was dashed out in a mere 15

The program's two disks are not copy protected. They contain 18 fonts that you can call on in addition to the fonts provided by your printer. If you need something different, 50 additional disks are available for the FX printers at \$15 each. If these don't fill the bill, then you can use the other program in the Fancy Font package, which lets you design your own fonts. A copy of the Hershev character database is provided to give you a starting point, and a separate 60-page tutorial and reference section explains this program in detail.

Fancy Font has four versions. The FX version supports Epson FX, RX, and JX printers, the IBM Graphics Printer, the Gemini printers, and Okidata printers with Version 2.1 Plug 'n' Play. The MX version supports the Epson MX (with Graftrax), NEC 8023, the C. Itoh Prowriter, the TI 855, and the Okidata with Version Lx Plug 'n' Play. Other versions of the Fancy Font program support the Toshiba

## Sorry! SixPack\*. We Got 8 Plus™!

All your Add-On needs satisfied in one package — The 8 Plus. Designed with the aim of providing a complete solution to your hardware add-on requirements Priced with the aim of giving you

value for money, this is an Add-On not to be overlooked. And our seal of confidence in the quality of our product - A full one year warranty.

Features: Parallel Printer Port

Serial Intertace Port Game Port Clock / Calendar 64-384K RAM

6. RAM Disk Plus (Software) Spool Plus (Softwe Piggybacked Floppy Disk Controller (Optional)



## Give Your Eye a Treat!

Quelity Style - on e PC - for the

The Lettertex " is fully compatible with the standard PC monitor and

you don't need any special software initialization package.

The physical price you pay for not buying a Lettertex" may be high. Anything, in fact from stress and fatigue to blurred vision

pleasing to the eye and easy-to-read. even at the end of a long session.

- Features: 18.432 KHz Horizontal Rate
- 32 MHz High Frequency Oscillator 14 x 9 Character in an 18 x 14
- 8Kb (4Kb x 2) Screen Memor PC Compatible Lightpen Interface
  Parallel Printer Port Operates with any 18.432 KHz Monitor

The Lettertex" helps combat these problems by providing a text thats



Using Lettertex

Contect CC&C Today for Deeler Information and Then Let Your Eyes Decide Cell (818) 576-1621 Telex 285653 ARC UR

CALIFORNIA 2001 W. Chestnut Street nbra, California 91803

1300 series and the Enson LO1500.

SoftCraft backs up the package with other programs, including special programs for Microsoft Word and MicroPro WordStar users, and a program that lets you "kern" letters for more attractive spacing. A version of Fancy Font for the Hewlett-Packard LaserJet is in the works. as SoftCraft continues to try to get the most out of popular printers. Fancy Font won't put a full typesetting shop in your printer. but for many people, it will be more than adequate to produce attractive type for a variety of purposes. If you can take the time to learn how to use Fancy Font, you will soon find it to be one of the best in its class.-Alfred Poor

#### NicePrint

NicePrint can breathe new life into your old dot matrix printer. It gives you a choice of six fonts, any of which may be italicized and printed in your choice of sizes from 5 to 17 pitch. You can change fonts in the middle of a document and even intermix NicePrint's fonts with your printer's builting fonts. The worse the quality of your printer's output, the more benefit you can derive from NicePrint.

#### Hard Disk Access

You can make a backup copy of the distribution disk on a floppy disk or put it into your hard disk. Your working copy will contain a customized set-up file specifying different parameters, such as type of print-

NicePrint Spies Laboratories P.O. Box 336 Lawndale, CA 90260 (213) 538-8166

(213) 538-8166 List Price: \$95 Requires: 27K R

Requires: 27K RAM more than the OS and resident programs, DOS 3.0, two disk drives. For use with IBM Graphics printers, Epson printers with Graftrax, Germini 10 and 15 series, and Okidata Microline printers with Plug 'n' Play.

## BT60 Streamer \$895 The Stack \$999





Don't mifer the Jose of Josing data. BT60 Streamer uses a half-beight streaming cartified step unit that runs on a 5.1.4 fm. controller card. Menu-driven software makes it easy of use. Copies up to 60 Megro on one tape at an amazing 5 Megro per ministell Recommended for PC60 internal hard disk system and the BT/SF10 tape backup system. BT/SF10 plugs into the floopy controller card-no extra act on seaded-and is accessed like a floopy; it uses spool of inps (\$12.95 allows you to beak up the FC60.) O Megro each. Software provided allows you to beak up the FC60.

CIRCLE 302 ON READER SERVICE CARI

## HR 134 (Amber) \$149 HR 39 (Green) \$139



Looking for an exceptional value on a high resolution monochrome TII monitor? Our models offer super crisp text and graphics capabilities (720 x 348 resolution) and plug into an IBM monochrome (or compatible graphics) adapter card. Both the HR 134 and HR 39 have 12 in. diagonal screens, IBM-matched color styling and include a tilt and swived base.

CIRCLE 303 ON READER SERVICE CAR



Inside California (805) 987-9741 Outside California (800) 821-4479 er and choice of fonts. If you're not already squeezed for memory, you can put all six fonts on your hard disk for immediate access by the program.

To access all NicePrint's features, you

embed backslash commands in your text. The only problem with this process is that some word processors will print these embedded backslash commands. You can also enter NicePrint commands to initialize your printer directly from DOS without embedding the backslash commands in your text file.

NicePrint supports the IBM Graphics printer, Epsons (MX requires Graftrax-Plus), Gemini 10 and 15 series printers, and Okidata Microline printers with Plug 'n' Play.

### Lattice Products Are Your Best Investment

Lattice TopView Tool- \$250.00 basket-Provides more than 70 functions that eliminate the need for extensive use assembly language when interfacing with TopView, Includes functions to control window cursor, pointer, and printer operations. Also provides access to cutand-paste facility and debugging services.

LMK\*\*-Automated \$195.00 product generation utility for MS-DOS, similar to UNIX "Make"

C-Sprite\*\*-Symbolic debugger for programs written in Lattice C or assembly language

C Compilers-MS-DOS \$500.00 and PC-DOS-The industry standard

Panel-High performance \$295.00 screen design and screen management system. Available for MS-DOS, PC-DOS, and UNIX systems

dBC II<sup>∞</sup> or dBC III<sup>∞</sup>— \$250.00 C function libraries supporting indexed files that are compatible with dBASE II<sup>®</sup> or dBASE III<sup>™</sup> C-Food Smorgasbord™ \$150.00
—Includes a BCD decimal arithmetic package,
I/O functions, IBM-PC
BIOS interface, terminal
independence package.

Text Management Utili- \$120.00 tles--(GREP/DIFF/ED/ WC/EXTRACT/BUILD)-Essential programming and documentation aids in any environment

olus many other utility

functions

With Lattice published products you get "Lattice Service" including telephone support, free updates during the warranty period, notice of new products and enhancements when you register, and a money-back guarantee. Corporate site license agreements are available.

Call us today for further information on these, or our many other C programs, utilities, and tools!



Lattice, Inc. P.O. Box 3072 Glen Ellyn, IL 60138 Phone [312] 858-7950 TWX 910-291-2190

We practice portability International Sales Offices

Benelux: De Vooght. Phone [32]-2-720.91.28. England: Roundhill. Phone: [0672] 54675 Japan: Lifeboat Inc. Phone: [03] 293-4711 Head-on Crash

While NicePrint seems to be completely compatible with most word processor packages, I did run into some peculiarities when running it with XyWrite. NicePrint is a memory-resident program, and once you put XyWrite in there, too, you can't bring up the NicePrint window or even return to DOS. If you try, you crash.

DOS. If you try, you crash.
Aside from the added fonts, how much
you benefit from NicePrin's improved
you benefit from NicePrin's improved
printer works without the software. A simple printer with very limited options would
probably benefit greatly. However, with
my Okidata 92, I noticed little improvement over the printer's built-in letter qualty mode, and NicePrint cut is speed from
nice, if you need them. But if you don't
believe the package offers quite enough for
its price, especially when compared to othtis price, especially when compared to
other
products on the market.—Jim Forney

#### Printworks

If you could predict the success of a software program from the track record of its parent product, Printworks would be expected to have a great future. Printworks comes from SoftSyle, that Hawaiian company with the unpronounceable address, which produced Printworks's predecessor, the successful Set-FX.

Like Set-FX. Primworks is essentially a set-up program—albeit a sophisticated one with some very nice features. You load Primworks from DOS, and it displays a well-designed menu with a single character preceding each option. To select that option, simply type the character or else highlight the option and press Enter. Either method quickly toggles the option, which consists of enhancements such as emphasis or italics. Some options require more than just a toggle; so Printworks prompts you at the bottom of the screen for the de-

#### Sophisticated Set-up

Printworks does give you more sophistication than the average set-up program. It lets you select from a variety of special fonts-such as the graphics fonts that load into the computer memory and translate your text into graphics output, with results that range from stylish to outlandish. Other special fonts include downloadable fonts. which go straight into your printer and create results similar to the graphics fonts but at a faster speed. One nice feature is that you can use the DOS wildcard characters when calling up the font you want; pressing the right arrow key then scrolls through a list of the fonts that fit the name so you can search for it without having to remember how to spell it.

Unfortunately, I was disappointed with the results of the graphics and downloadable fonts. Even with emphasis and doublestrike, many of the fonts I tested produced underwhelming results. Many of the characters seemed poorly defined and hard to read: fonts with essentially straight, or block, characters were the only exception. All the fonts were apparently designed for the typical six-lines-to-the-inch vertical format, and so the size of the characters varied little.

My other major complaint about the package is that the demo file and the manual are misleading about the program's capabilities. The demo prints out two pages showing more than 20 fonts, plus graphics and sideways spreadsheets (a nice fea-

## Printworks

SoftStyle Inc.

Hawaii Kai Office Bldg., #205 7192 Kalanjanaole Hwy.

Honolulu, HI 96825 (808) 396-6368

List Price: \$69.95

Requires: 128K RAM, DOS 1.1 or later. For use with most IBM PC-compatible dot matrix printers. CIRCLE 627 ON READER SERVICE CARD

## AT Enhancement Kit (ATK-1) \$1595



Our AT enhancement kit is the best way to turn your Basic AT into an nanced version--and then some! By adding the Basic Time AT4X4Plus with 512K of memory to your system, you'll have 640K of contiguous memory with 128K above 1 Megabyte (double split memory addressing) for use with VDISK. AT4X4Plus comes standard with a serial and parallel port. Up to 4 Megabytes of memory, three more serial ports and a game port are optional. The 44 Meg (as opposed to a 20 Meg) hard disk is a high-speed voice-coil-driven model with a 30 ms. average access time.

CIRCLE 307 ON READER SERVICE CARD

## BT6Plus 64K \$179



imply, the best deal on a PC multifunction board-bar none. Basic Time's six function board, the BT6Plus, includes memory sockets for adding 64K to 384K, parallel printer port, asynchronous (RS-232C) serial communications port, battery-powered clock/calendar and electronic disk emulation & print spooling software. Optional game port. Comes complete with an easy-to-understand installation instructions/user's manual.

CIRCLE 305 ON READER SERVICE CARD

QURIF

Inside California (805) 987-9741

Outside California (800) 821-4479

ture), and the manual describes the demo as "a demonstration of the capabilities of Printworks." However, you can't produce a document using all those fonts together. The program sets the printer to print one way and only one way. (If you are so inclined, there's a way to download two fonts, and then set a third native font, and select them from within your document file using your printer escape codes, but if you can do all of that, do you need this program?) When I asked a SoftStyle representative about this limitation, she said the company is aware of the problem and is still searching for ways to demonstrate the program's capabilities without overstating

its flexibility. Printworks has a variety of attractive features and supports a host of printers. It lets you set forms control parameters through a second menu and even call the program with all the desired parameters specified, so that the settings are automati-

cally adjusted. Thus you can create .BAT files for different settings that you use often or even call the program in your AU-TOEXEC BAT file that configures your printer in your favorite way. Since Printworks is not copy protected, you can put it anywhere you need it. A separate font editor lets you modify existing fonts or create your own.

Overall. Printworks is a sophisticated program that does only one thing at a time. As a program to configure the native fonts of your printer, it works quickly and cleanly and even prints spreadsheets sideways. On the other hand, since you must run it before your other application, it is susceptible to printer reset (the manual spends a page and a half on ways to avoid this problem). The decorative fonts are not very attractive-at least on an Epson FX. So to avoid disappointment, base your decision about Printworks solely on its other strengths.-Alfred Poor

#### Sideways

If you regularly print spreadsheets and haven't already bought Sideways, perhaps it's time to get a move on. This program prints spreadsheets vertically-and elegantly-for only \$60. Any way you look at it, Sideways sets the standards for this

Sideways Funk Software Inc. P.O. Box 1290 Cambridge, MA 02238

(617) 497-6339 List Price: \$60

Requires: 64K RAM, DOS 1.0 or later. For use with most IBM PC-compatible dot matrix printers.

CIRCLE 624 ON READER SERVICE CARD

## Can your editor work with 16,000,000 bytes of memory?

SPF/PC" 1.8 from



The best full screen editor for the IBM PC is now even better than ever. It looks and works like IBM's large system SPF editor, but SPF/PC executes faster and handles larger files than its mainframe cousin.

AT EXTENDED MEMORY SPF/PC can use up to 15.850 KB of memory.

TOP VIEW COMPATIBLE SPF/PC supports windowing and background execution.

COMMUNICATIONS FEATURE Easy to use communications software.

**FAMILY TIES** \$195 UPGRADES only \$50



· SPF/PC is used by IBM to demonstrate the IBM 3270/PC to its corporate clients SPF/PC provides the same outstanding performance on any PC, from JR to AT . SPF/PC works with DOS 1.00-3.00 and

any IBM PC or true compatible with 192K rademark of Command Technology Corporation

TO ORDER SPF/PC...

Contact: Command Technology Corporation 1900 Mountain Boul Oakland, CA 94611

CIRCLE 182 ON READER SERVICE CARD

(415) 339-3530 Telex: 509330

particular type of software program.

Depending on the type of output you

Depending on the type of output you want to create, you can invoke sideways printing using Sideways with a command line in DOS or through the main menu. Both methods are extremely easy to use. The DOS command, for example, is SIDEWAYS —Silhenames—A the main security of the command of the co

Because Sideways can rotate any ASCII file, you can use it to print other files than those that include spreadsheets. You could print word processing files vertically, for example, to help create oversize charts or tables without having to cut and paste.

Sideways's most difficult-to-use element is tig luc-lines facility, and even that is fairly easy to handle. Since many spreadsheet programs divide a worksheet into sections for horizontal printing, glue lines were developed to restore the entity spreadsheet to its original form. The Sideways manual explains how to define glue lines for each of the popular spreadsheet

programs. The manual is a testimony to the program's case of use and versatility. Half of the 28-page documentation explains how to interface with spreadsheet programs. To get the program up and running, most users will have to read no more than 6 pages. The rest of the book tells you how to create ASCII flies from 1-2-3, VisiCale, Symphony, Multiplan, and SuperCale 2 files.—VincentPuglia

#### Select-A-Font

Select-A-Font is an entertainment-oriented printer enhancement program distributed by IBM Personally Developed Software. The best thing about Select-A-Font is that you can get it with PC Palene and two other graphics programs in the Creativity Package.

While it does generate printouts using different type styles, Select-A-Font is not

## Enhanced Keyboard ff5151 \$159



An affordable, productive solution to your non-standard keyboard. Hilb 151 uses old-state capacitive key switches-priving you totalle feedback through your fingers. Avoid Num Lock combusion with our separate custor control and numeric keyped and LiB Indicators on the Lock keys. We've returned keys to their standard estup including the lock keys. We've returned keys to their standard estup including features include an extra Control key in the function key row. 3-position height adjustment and sleek color matched styling. Plugs into IBM PC, PCAT and Company Deskpro.

CIRCLE 312 ON READER SERVICE CARD

## Take The Qubie' Acid Test

Going to a dealer and watching a few color demonstration programs or typing a few lines of text is no match for the text you can make with Qubie. We are so condident that you'll like our products, that we'll give you 30 days to try then out. If you are not positively actualled, return the item for a complete retund (even the cost to send it back). Euchtermore, we have a fest 6th our turnsmound on repairs during Preferred Customer Plan with 24 hour repairs and 2 years of coverage—all for details.

California residents add 6% sales tax. No extra charges for surface freight, insurance, COD, Visa or Mastercard. Personal checks allow 18 days to clear. Company purchase orders accepted, call for prior authorization. UPS Blue Label available at an additional charge.

Hours: Mon.- Fri. 8 am - 5 pm PTZ Sat. 9 am -1 pm PTZ 4809 Calle Alto Camarillo, California 93010



London (01) 871-2855 Paris (01) 321-5316 Sydney (02) 579-3322 Canada (403) 438-0994 CIRCLE 313 ON READER SERVICE CARD



Inside California (805) 987-9741 Outside California (800) 821-4479



## Best Friend Makes PC-DOS

Easy To Use! Best Friend™ rescues you

from cryptic DOS commands with easy to use menu selections for disk and file operations, printer output redirection, "pop-back" features and more.

#### Disk and File Services

. Copy, Delete, and Rename Files

·Find, View, and Print Files •Change File Attributes (Make hidden files)

·Sort files and directories using up to two keys Tag files for group copy and delete operations
Format and Copy Disks
Make and Remove Sub-directories

#### Change Disk Volume Label Names Scientific/Business Calculator

Over 40 math and business functions ·Printable on-screen tape display

#### **Electronic Typewriter**

·Straight type-thru and line edit modes

#### ·Automatic word wrap and margin controls Printer Output Redirection

Capture the printer output (even "Print Screen" data) from any program into a disk file.

Carefully Describe your Computer System

Mrs u \_\_8 tu \_\_16 tu

Pop-Back Feature Use Best Friend even while running another program. "Pop-Back" to Best Friend from all your favorite programs.

#### System Requirements (Not copy protected)

DNS Finend can be obtained as one memory efficient program (uses 126K) or any one function may be obtained as a stand alone program. Best Friend and family will operate on an IBM-PC, XT, AT or true PC compatible. In addition, the File Services and Printer Output Redirection functions are available for most computers using CP/M-80<sup>TM</sup>, CP/M-86<sup>TM</sup>, and MS-DOST

Best Friend is a TM of Else Solsanse Development, Inc. IBM and PC DOS are registered TM's of International Business Machines Corp. CP/M 80 and CP/M 86 are TM's of Digital Research, Inc. MS DOS is a TM of Moresooth Corp.

#### Elite Software Development, Inc. P.O. Drawer 1194 Bryan, TX 77806

Available at better dealers nationwide or call Elite Software at 1-800-648-9523, Texas 409-846-2340

Best Friend (Full persion)

Best Friend (Demo version)

(Functional, with limitations)

\$14.95.

PC DOSMS DOS CP/M 80CP/M 86	Typeuriter only	\$39.95_
My computer's name / model is	Celculator only	\$39.95_
Any computer's name? model is	File Services only	\$39.95_
The disk size I use is	Printer Output Redir Only	\$49.95_
□3W* □5W* □8*	"Add \$4 for shipping and h	andling to U. or foreign and
Nome		
Shipping Address	Amount (TX 6% tex)	
o-sping recent	Payment VISA MC Banks	Droft Check
	Credit Cord Exp Date	_/
City	Conf.	
Stone Zp		
Telephone		
COD's and Purchase Orders WILL	NOT be accepted by Elite Software	Texas residen

CIRCLE 206 ON READER SERVICE CARD

#### NO MATTER WHICH COMPUTER YOU USE. WE COVER ALLSYSTEMS & THEIR NEEDS

Every month CREATIVE COMPUTING brings you the information you need to expand the functions of your system-any system-without any bias. Whether you're expanding your Apple, IBM, Atari, TRS-80, or any other computer with new hardware, software, or add-ons, you should know about all the products and applications available for it. Stay in the know and make the most out of your

computer! Subscribe to CREATIVE COMPUTING today and save 50%!

FOR FAST SERVICE CALL 1-800-852-5200 TOLL FREE Creative Computing PO. Box 5214
Boulder, Colorado 80322

#### ☐ Please accept my subscription to CREATIVE COMPUTING for I year (12 issues) at only \$12.49. I save 50% off the regular subscription price of \$24.97 Mr./Mrs/Ms... (please print full name) Cirv Check One: Payment enclosed Bill me later Charge my: American Express Visa MasserCard

	Hease allo-	w 30 to 60 days fo	e delivery of fin	c insue	BZ4	ŀ
•	 					•

ASER PRINT™ 1.0 \$ €	Ia
lewlett_Packard I aser lets	דו
Canon Laser Beam Printers	E.

Harness The Power Of Laser Printers! Powerful Document Formatting/Typesetting. 100 Simple, Word-like Commands,

NOT COPY PROTECTED. Use With Any Word Processor, Spreadsheet.

Put Commands In 1-2-3 Spreadsheet Cells! Add Sizzle To Database Reports. · Create Documents, Forms, Letterheads, ...

Easy Graphics Creation Of New Fonts, Logos Diagrams, Computer Signatures, This AD, ... 10 Day Money Back Guarantee. H-P LISTED

Enhanced Graphics Version LP2.0: Circles, Boxes, Lines, Shading, Ellipses, Ovals.

Call (617) 236-1892 MC/Visa.

Janus Asse								
MA 02116	Check	Boxe	15: [	] UPS	COO	D H-	P []	Cano
[] LP1.0 !	99	E) LI	2.0	\$199		Add \$	6 Shi	pping
Name					Phon	e		
Address								
						e *		

Select-A-Font IBM Personally Developed Software

P.O. Box 3280 Wallingford, CT 06494

(800) IBM-PCSW

List Price: \$19.95; Creativity Package, Requires: 128K RAM, DOS 1.1 or later.

For use with all IBM PC graphics-compatible printers

CIRCLE 623 ON READER SERVICE CARD

in the same league as LeBaugh's LePrint and Hammerlab's Lettrix. It does not print letter quality documents. The smallest type size it can print, is 3/16 of an inch high. And although four of the nine typefaces are variations of Times Roman, they are too ornate for business correspondence.

Select-A-Font's typefaces suit greeting cards, diplomas, and invitations more than sales reports and profit projections. The program is not a toy, but it's great fun to play with.

Select-A-Font controls almost every aspect of printing. The font selections include nine typefaces, two italic, two script, and all proportionally spaced. Type sizes are 3/16, 5/16, and 3/8 of an inch.

You can also define a character or group of characters to be printed in any of nine widths or two densities. You control underlining completely; if you want to underline every other character in a word. you can. Conversely, you can have a solid underline that continues even between words. You can justify copy ragged left or ragged right as well as centered. You can change fonts, widths, and size on any line without losing the base alignment. Finally, the program permits page formatting and tabulation.

Although Select-A-Font is not a childish program, it's best to bring out the child in you to use all its features in the most creative ways .- Vincent Puella

#### Fontrix 2.5

Fontrix 2.5, a new program from Data Transforms, can create fancy text images

on the screen and even do some drawingthe kind that most typical paint programs allow. At first you might assume that its capabilities for importing text are limited, but take a look at a file called DEMO-

TEXT, which you can import into the Fontrix graphics writing module. Wow! If this package doesn't make it as a printer utility. it certainly has a great future as an animation package.



## Dot Matrix Made Beautiful

All the type in this ad was printed on an inexpensive dot matrix printer with Pancy Foat, the program that works with almost any word processor to produce high resolution, proportionally spaced, letter

quality printing.

No special hardware or installation is required, so you'll be using Pancy Font as soon as you get it.

Fonts, including Roman, Sans Serif, Bald, Italic, Joseph, 6th English and more, from 8 to 24 points come standard with Pancy Font.

FLEXIBLE. Fancy Font comes with a complete set of over 1500 mathematical, foreign language and other special symbols. Hundreds of additional fonts in sizes from 6 to 72 points are available, at a nominal additional charge, from our growing font library.

available, at a nominal additional charge, from our growing rost none. You can cell any character and also create your own characters or logoe, up to I lach by I inch.

Powerful formatting features let you center, justify, wordwrap a type flush left or right, with or without running headers and footers even with different foots and sisce on the same flow.

COST EFFECTIVE. You buy Fancy Font from your local dealer or direct from us, the software developers, for only \$180. You get near typeset quality at a small fraction of the time and cost of using art or typesetting services.

using art or typesetting services.

Pancy Fost runs on PCDOS, MSDOS and CP/M systems with E-

oshiba and compatible dot matrix printers. You'll be turning out great looking reports. py of Fancy Font. The applications are limited only by your

agination.
Call or write now to order Fancy Font or ask for additional
formation including actual samples and independent review

CALL TODAY 1-800-351-0500 MasterCharge and Vin Acc

SoftCraft, Inc.

222 State Street, Madison, WI 53703 (608) 257-3300 Funcy First is a registered trademark of SoftCraft. Inc.

CIRCLE 241 ON READER SERVICE CARD

## A Division of CW Marketing, Inc.

## ORDER 1-800 IBM ONLY





2222 East Indian School Road Phoenix, Anzona 55016 Order Line 1-800-426-6659 Order Processing: 602-224-9345 10 00 am - 3:00 g m Monday - Finday

Order Line Hours Mon. Fin8:30 - 5:30 Saturday 9:00 - 1:00

Due to Copyright Laws No Returns on Software Purchases. Call Add 2% for C.D.D. C Call on Purchase Orders

No Charge for VISA and Mastercard Free Arrappies CNLY to orders up to 10 lbs Shoping and Handling Add 86 00
 Personal and Company Chucks Will Delay Shipping 2 weeks
 Proce & Availability Subject to Change Wilhout Notice We Do Not Quarantee Machine Compatibility

Gem Desktop ..... Call

Word Perfect (Ver. 4.0) \$209 Supercalc 3 (Ver.2) ... \$159

### PROCESSORS | 1669 WIND PROCESSORS | 1669 WIND PROCESSORS | 1509 WIND FROM \$1 \$1.00 WIND FROM \$1.00 WIND FR | Character | State | Character | Characte UTILITIES ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 192 | ### 19 ACCOUNTING Accounting Partner BPI - GL. A.R. A.P., Payroll **1** 

tecal 3.0 tecal # 8007 3.0 ool Box TRAINING 1 22 25 26 27 Restorings
Bind Proter
Turbe Turb
Typing Instructor
Typing Tutor III MINEY MANAGEMENT

Marcell MD-2 (Ory, 100) . . . . . . . .

nable ramework SPREADSHEETS Letus 1-2-3 ..... met Auditor 2.0

rel ....

### HARDWARE

COMMUNICATIONS
or State DI

DISK DRIVES PRINTERS Monitors Call Graphic HG 12 9 445 Call AST Siz Pack \$ 249
AST Alcrarings 369
AST Alcraring

PRINTERS (CONT'D.) PLOTTERS MODEMS m 1200 m 12008 m 2400



Wordstar 2000 ..... \$239 Wordstar 2000 Plus ... \$289

PROJECT MANAGEMENT Narvant Project Manager \$199 Narvant Total Project Manager 245 Microsoft Project 149

Masterpiece ..... \$ 89

## A DEFINITIVE ENCYCLOPEDIA IS YOURS!

FOR LESS THAN 92¢
A VOLUME!

A DD-ONS AND ADAPTORS
BUSINESS APPLICATIONS

OMPARISON CHARTS

ATABASE DEVELOPMENTS

E XPANSION CHARTS

INANCIAL PLANNING

RAPHICS INNOVATIONS

ARDWARE REVIEWS

OB/BATCH FILES

KEYBOARD OVERLAYS/TEMPLATES

LOCAL AREA NETWORKS

MOUSE INTERFACES
NORTON CHRONICLES

OPERATING SYSTEMS

PRICE WATERHOUSE REPORT

UALITY CONTROL PROGRAMS RECREATIONAL SOFTWARE

SUPPORT SERVICES

TUTORIALS FOR EXPANSION

U SER-TO-USER TIPS VIDEO INTERFACES

ORD PROCESSOR EVALUATIONS

T, AT, AND COMPATIBLE PCs

ou can CALL TOLL FREE 1-800-852-5200 to subscribe

to PC Magazine, a

Z iff-Davis publication.



Mr./Mrs./Ms. (phase point fell name) PC 4591
Company Title Address City State (Processing Processing Processin

☐ Payment enclosed

☐ Bill me later

PC 459

City\_\_\_\_\_\_\_State\_\_\_\_\_Zip\_.
Add \$17 additional postage outside the U.S. Please allow 30 to 60 days for delivery of first issue

# YES! I need a ready-reference to help me meet n professional PC needs. Please accept my one yea

AUL/DES/DES.

(phone pear lell name)

Title

Address

City

State

Zip

Add \$17 additional postage outside the U.S. Please allow \$0 to \$00 days for delivery of first in

\_\_\_\_\_

# YES I areed a ready-reference to help me meet me professional PC mode. House except my one year subscription to PC Madestine 24-bi-weedy to such

YES! I need a ready-reference to help me meet m professional PC needs. Please accept my one year subscription to PC Magazine—24 bi-weekly issue for only \$21.97!! save 32% off the regular subscription price!

Dayment enclosed 
Bill me later

☐ Payment enclosed ☐ Bill me la

Company	(please print full name) Title		PC 459
Address			
City	State	Zip	
Add \$17 additional post	are outside the U.S. Please allow 30 to 60 days for	r delivery of f	ret lesse



## BUSINESS REPLY CARD

Postage will be paid by addressee

P.O. Box 2443 Boulder, Colorado 80321



NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES



NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

## BUSINESS REPLY CARD First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee

P.O. Box 2443 Boulder, Colorado 80321



NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

## BUSINESS REPLY CARD First Class Permit No. 66 Boulder, Colorado

Postage will be paid by addressee



80321



## PC Magazine-

The ultimate source of business and professional IBM PC applications—a virtual encyclopedia of information for PC users!
The unbiased reviews, proven applications, and analytical evaluations in PC Magazirie bring you the most comprehensive and accurate coverage available—every two weeks!
Make sure you have a complete reference on-hand to help you meet your professional PC needs?

Subscribe to PC Magazine today!



## Bring your company's presentation graphics into the computer age with the best recommendation you can make: Hewlett-Packard.



Hewlett-Packard's Graphics Plotters introduce professional-quality graphs and charts to the office... quality that, quite frankly, makes the competition look stone-age by

comparison.

Combine our brilliant color capability, precise line quality, and proven reliability—and HP becomes the obvious choice for your presentation graphics needs. When it comes to plotters, it's easy to see why HP has become the world's Number One recommendation.

#### Compare the quality of an HP Plotter...

Before making your graphics plotter recommendation, find out how HP stacks up against the competition. Here's a quick checklist:

Are the lines sharp and bold? Do they meet precisely? Are the diagonal lines smooth? Is the text easy to read? In a chart, is the area fill uniform? With HI? the answer is always yes, yes, and...ves.

#### Runs with leading PC's and software packages.

HP Graphics Plotters are compatible with most of the personal computers in your office, including IBM, Compad, and AT&T—as well as a host of HP computers. Vou even have a choice of many off-the-shelf software packages, such as Lotus 1-2-3" and Symphony: that give you "first-day" productivity.

#### Send today for your FREE sample plots-

Leadership in Business Graphics. For Leaders in Business.



YES, I'd like to make the most informed business graphics recommendation I can. Please send me your detailed brochure, plus sample plots so I can see exactly what my company's presentations have been missing. I understand I will receive this information without cost or obligation.

nation with	out cost or obligation	
Vane		
Date		
Company		
Address		
Dity	State	Zφ

Mail to: Hewlett-Packard, 16399 W. Bernardo Dr.

San Diego, CA 92127-1899

Attn: Marketing Communications

Fontrix may be the most powerful graphics tool in its price range for the IBM PC. To use Fontrix in its simplest form, you call up Graffile—a workspace that generally spans more than one screen. With Graffile, your display becomes a window on a larger "sheet." You can choose which fonts (up to 10, memory perfonse with the property of the property o

Fontrix 2.5 Data Transforms Inc. 616 Washington St. Denver, CO 80203 (303) 832-1501 List Price: \$155

Requires: 256K RAM, DOS 2.0 or later. For use with most IBM PC-compatible printers, including models from Epson, Okidata, C. Itoh, Toshiba, IBM, and Xerox/Diablo. Mouse optional.

CIRCLE 619 ON READER SERVICE CARD

mitting) to load, then select the one you want with the appropriate function keys. You can also select a host of enhancements such as bold, italic, mirror, rotated, and

Besides specifying text details, you also can draw; boxes, circles, and lines become much quicker and easier to create. You also have colors and patterns to choose from for the text, the drawings, and the background.

You can make all your choices through "'pop-down'" menus that appear in response to certain Ctrl-key commands. Also, a limited help facility takes you to the same menus after some prompting.

Once you have created your masterpiece, you can print it on any one of several dozen printers. The program even has drivers for a number of ink jet printers as well as the H-P LaserJet. (The documentation points out that the limited buffer of the LaserJet restricts you to 75 dot-per-inch

resolution for full-page graphics.)

You can prepare your text with any word processor, then inport it into your Graffile. The text will be entered with the type fort specified in your settings and centered or justified as you wish. You can also embod nearly every different command available in the interactive mode into your text file, and it will be executed when the file is imported. Therefore you can can set to to operar, files to be drawn, are case text to oppear, files to be drawn, are case text to oppear, files to be drawn, are whole areas to be crusted. The embedded commands don't look too difficult to hardle, but you should become confortable with the interactive mode before twyine to with the interactive mode before twyine to

embed your instructions.

Fontrix has extensive documentation: a substantial tutorial, a thorough reference manual, and a "quick start" pamphlet to help impatient users. You can even edit and create your own fonts. Data Transforms offers 11 font disks, containing such

## Last year the experts tested the top-of-the-line Toshiba 3-in-One printer. Here's what they said.

When Toshiba America called to see if there were problems testing their printers, Iresponded, You bet—I can't get the P1351 off Bill Machrone's desk long enough to get its picture taken!' It's that good.

(Bill Machrone is the editor of PC Magazine)

PC Magazine November 27, 1984

Computers & Electronics Magazine November 1984 elements as classic and fancy alphabets, architectural and engineering symbols.

Some of the fonts are a bit rougher looking than you would expect, with more "jaggies" on the large, curved letters than on those of some other products. But if you reduce image size before printing (as was apparently done for the manuals), the final quality is certainly acceptable.

quanty is certainty acceptance.

Fontrix is much more than a way to get
condensed bold type out of your Epson. If
you need more variety and want a program
that you can push to the limit, Fontrix deserves a place near the top of your "must
see" list.—Alfred Poor

#### LePrint

LePrint's forte is producing documents that look typeset on a dot matrix printer,

but the program also supplies a correspondence quality mode and a draft quality mode for jobs that just can't wait.

LePrint also has features you can't find in similar programs. For example, it lets you define up to nine macros, which can include embedded commands. It can also print partial documents and merge small sections of files. If you combine the macro and merge capabilities, you can use Le-Print as a rudimentary mail-merge program. Another command allows you to force page breaks, thus avoiding widows and broken tables and charts.

LePrint lets you control every aspect of the document's appearance, from the type style to the page format. You can use as many type styles and sizes on the same line as you want. And LePrint automatically aligns each line. Any character can be as small as ½ of an inch or as large as 10 inches. You can underline in either broken or solid lines. You can even center lines

and automatically tab to a column.

LePrint works with some 38 printers,

### PO FACTIFICE

an LePrint
LeBaugh Software Corp.
2720 Greene Ave.

Omaha, NE 68147 (800) 532-2844 (402) 733-7600

(402) 733-7600
List Price: Standard package with 5 type styles, \$149; each additional style, \$19; extended package with all 14 type styles, \$275.

Requires: 128K RAM with DOS 1.1, 192K RAM with DOS 2.0 or later, color graphics adapter recommended. For use with IBM PC-compatible printers, including models from Epson, Toshiba, C. Itoh, Inforunner, Panasonic, Star Micronics, and Okidate.

CIRCLE 622 ON READER SERVICE CARD

"

## Imagine what they will say about its successor.

The New Toshiba P351 3-in-One printer. They could say that inside the seleck new Toshiba P351 you'll find the ultimate 3-in-One printer Beause it offers a combination of: Letter-quality printing. Perfectly translated graphics. And speed. (100 cps letter. And draft speed improved to 288 cns.)

They could say you'll appreciate the 24-pin dot matrix head that gives the P351 its exemplary letter and graphic quality.

quality
They could say the new P351 gives you an almost
unlimited number of ways to express yourself. With both
downloadable software fonts and new plug-in lont
cartridges.



only the best looking printer in the \$1,000 to \$2,000 range. But also the most reliable.

Of course, we're not putting words in their mouths. Just the ultimate 3-in-One printer in their hands. And yours. For complete information call 1-800-457-7777, Operator 32.



#### What to do after you've tried banging on the PC and yelling 'I know you're in there'.

et's face it. Human beings have a tendency to lose things. Socks. Car keys. Data. Losing your data has got to be the absolute worst. Time for



The Norton Utilities" with UnErase," a powerful file recovery tool that actually searches for and retrieves lost data. But sometimes files aren't altogether lost, just misplaced. The File Find utility will search your directories and dis-play your file by name. Text Search will search for specific text if you can remember some identifying words of the file. Other utilities sort

through your directories and

list them five different ways. You can also gauge file space, wipe files clean or protect your data from accidental deletion. The Norton Utilities

version 3.0 is designed for the IBM PC. PC-AT. and DOS NEWSLETTER compatibles. Available at Computerrecommended for land and most software dealers. Order direct for \$99.95

from Peter Norton. 2210 Wilshire Boulevard, Santa Monica,

CA 90403, 213-399-3948, Visa and Mastercard welcome.

DISK MANACEMENT UOLUMB/SITE A life saver for your data.

LICENSES AVAILABLE.

TIME-LIFE

ACCESS

says "Highly

business users."

CIRCLE 346 ON READER SERVICE CARD

#### PRINTER UTILITIES

but the only word processor it directly supports is WordStar. LePrint's commands are similar to WordStar's dot commands. As a result, inserting them within the document itself is not a problem. According to a LeBaugh spokesman, LePrint will soon support other word processors.

The program's documentation is printed with one of LePrint's type styles. And, if you were wondering about type quality, you'd never notice that it came from a dot

matrix printer except for its freshness Lest you think LePrint is perfect, be warned that the program is slow-very slow. And it doesn't print sideways, and so if you were thinking how good a string of 10-inch-high letters would look in a banner, think again.

The stripped-down entry version of Le-Print (\$149) comes with five of the most popular typefaces used in publishing and business: Courier 10. Prestige Elite 12. Pica 10, Times Roman, and Times Italic. The extended package version (\$275) adds nine more typefaces, including a library of special symbols such as trademark and copyright symbols.-Vincent Puglia

		J	K	L	н
39	13,650	12,050	12,900	16,350	16,400
48	4,488	6,500	4,788	3,300	2,788
41	1,700	3,400	5,500	8,000	8,800
42	9,888	30,000	10,000	10,000	18,660
43	5,858	19,500	11,788	11,788	11,780
44	2,108	6,600	6,688	6,680	6,600
45	2,500	2,500	2,500	2,500	2,500
46	588	2,688	1,000		3,000
47	300	400	500		
48	5,768	5,768	5,760	5,760	5,760
49	238				345
58	7,588	5,000	1,006	1,000	1,680
51	5,000	5,000	5,000	5,000	5,000
52		9,500			
53			2,500		2,580
54	1,500	758		1,080	
55					

Anyone who's ever used 1-2-3" knows the

teeling The number's there in black and white, but you can't remember

what assumptions went

Introducing Note-It." The simple program that lets you easily attach notes to your rem copyright 6 1985 Access Learning Technology Coro. 12-3 is a trademark of Latus De

1-2-3 spreadsheets. To remind yourself. Or to

explain things to others.

#### Overhead Express 1.11

Overhead Express produces formatted printed pages with four fonts, five type sizes, and several symbols. You can use them to create overhead transparencies. flyers, or anything else requiring large type on 81/2- by 11-inch paper.

The program is copy protected, but you can install it on a hard disk. To start up you

#### Overhead Express 1.11

Business & Professional Software, Inc. 143 Binney St.

Cambridge, MA 02142 (617) 491-3377 List Price: \$195

Requires: 192K RAM, DOS 2.0 or later. two disk drives. For use with IBM PCcompatible printers, including models from Espon, C. Itoh, Okidata, IBM, NEC, and the Apple Matrix Printer.

CIRCLE 621 ON READER SERVICE CARD

must have the key disk in drive A:.

A built-in full-screen editor lets you create "presentation" files that contain text and dot commands. The dot commands control alignment and spacing. specify fonts, set margins and tabs, and draw boxes. With the editor you can insert dot commands automatically into the file by using a combination of function keys and menus; you can also change spacing, columns, formats, and fonts within lines by using backslash commands.

Overhead Express also has an express facility that consists of 12 standard templates. The presentation and template files are both in ASCII format; so you may edit them outside of Overhead Express. Likewise, you can merge any ASCII text files with presentation files.

The four fonts are not very interesting, and the selection of symbols includes only arrows, card suits, boxes, a star, a pointing hand, and a few others.

Another problem involves using sophisticated dot commands, then seeing their effects on the screen. The dot commands allow equal or centered spacing without your doing any measuring, but it is tricky to use the program effectively for more-complex tasks. None of the three ways to preview a document on a color graphics display gives a satisfactory approximation of the print.

You can use Overhead Express easily with the presupplied templates, but creating a customized, reasonably complex document takes lots of time and feels like programming. The program's limited capabilities and difficult command system make it less attractive than some of the other programs designed for similar tasks. -Charles Petzold

#### Sign-Master 5.1

Sign-Master 5.1 is a generally well-de-signed program that creates formatted presentation-quality signs on plotters and printers, in color and black and white. Its installation process is long but painless and is only invoked the first time you run the program. With less than an hour's practice, you'll be printing out your first sign.

### LaserJet Printing with WordStar® and Lotus 1-2-3°

Polaris PrintMerge<sup>im</sup> is a print control program that prints WordStar and ASCII print files like Lotus 1-2-3. By using Polaris PrintMerge<sup>1m</sup> you can create simply the best most professionally perfect printing possible by the LaserJet. Camera ready Documentation, Proposals, Spreadsheets, Reports, Manuals and Newsletters are all quickly and economically printed with that we really care appearance. Here's what others are saying about Polaris PrintMergeten,

- InfoWorld Review \*POLARIS PRINTMERGE TAKES THE WORRY OUT OF USING THE HP LASERJET EFFECTIVELY WITH WORDSTAR AND I-2-3. Do we like Polaris PrintMerge? YOU BET." (6/10/85)
  - John C. Dyorak, InfoWorld & PC World Columnist cave an angualified ping to the program saylog: "I highly recommend it" (4/1/85).
- Recommended by Hewlett Packard

Print any fant Anywhere \* Anytime \* Micro Justifled \* Centered

In Columns \* Lines & Boxes \* Integrate Charts & Text \* Merge Files & Text

Paragraph Reformatting of Proportional Fonts \* Supports All 15 Font Cartridges

\$ 124.00 not copy protected Money Back Guarantee Call or Write for Your Copy Today 619 471-0922

\$ 99.00 copy protected

310 Via Vera Cruz, Suite 205, San Marcos, CA., 92069 PC or MS DOS "196K RAM IBM PC, KT, AT, or 100% Compatibles & 512K RAM HP 110

CIRCLE 134 ON READER SERVICE CARD





with the cell they explain. Even when you modify the spreadsheet. Or transfer your tiles to someone And Note-It costs just \$49,95,\* plus \$2.00 \*CA residents add 7% (\$3.50) sales tax. Note it is a trade

Order Note-It t hone. We accept Master-Card or Visa. Or send us a

check or money order with your business card attached

(In CA 800-441-2345 x52 10201 Yorre Ave Cupertino, CA 95014

Note-It:

## Hardware and software. Where?

Haiur	raic ai	u	301thare.	** 110101
HARDWARE	Color Card Graphics Card (Mono )	159.95 309.95	IBM-PC HARD D	RIVE SYSTEMS
CURTIS SURGE PROTECTORS           Diamond         32.95           Ruby         59.95           Emeraid         42.95           Sagnhise         49.95	PARADISE Modular Graphics Card SIGMA Color 400T (Flaxen 440	269.95 499.00	IBM-PC 256K     10MB internal hard drive     360K disk drive	[1]

CURTIS SURGE PROTEC	TORS	PARADISE	
lamond aby	32.95 59.95	Modular Graphics Card SIGMA	269.95
merald apphire	42.95 49.95	Color 400T (Taxen 440 Color 400 l/Princeton SR-12	499.00
DATASHIELD POWER BA C-200 200 watt (for PC)	CK UP 295.00	TECMAR Graphics Master	469.00
T-300 300 watts (for XT) T-500 500 watts	399.00 649.00	MEMORY	ens.

99.95

139.95

7.95 54.95

109.95

110 95

149.00

104 95

1895.00

479.95

PC

DCA INC

KEYTRONICS

KENSINGTON

KOALA

MOUSE SYSTEMS

IMSI

VERSATRON

DISK DRIVES

HARD DISK DRIVES

FOR IBM

HIGH SPEED INTERNAL HARD DRIVES FOR IBM AT

Complete with soltwere, Moun-ting rails & instructions 30Msec

ting rails & instructions JUMSec Avarage Access Time. ID-40AT 51MB JUMS tornal 1295.00 ID-60AT 72MB delars tornal 1549.00

HIGH SPEED INTERNAL HARD DRIVES MBM XT WICONTROLLER 51MB 42MB formation 1495.00

INTERDYNE

IOMEGA BERNOULLI BOX 20 MB (2:10 MB in cebinet) 2489.0 FIXT Autoboot ROM (labove 89.9

POWER SUPPLY 130W Internal Power Supply High quality, 110-230V ACconvertible.

ear warranty, +5V/15A, +12V

RODIME

Complate with controller . 524.95

TALLGRASS Hard drive sub system with back New! 7G-5025 279

cludes interface card for IBM-PC

TAPE BACK UP SYSTEMS

Svagen 45MB Internativat Atr Call

Tecmar 60MB External at At 1495.00

yagen 45MB External (xf, A7) yagen 45MB internal (xf, A7)

IOMB 31/2" shock mounted hard dri

72MB 508MS torrotted

1 year warranty, 4.2-8.5A (peak).

Internal 10MB tape backup for IBM PG/XT

Irma Board 3278 Emulation

Naw! KB-5151 keyboard

PC Mouse with PC Paint .

64K Memory Upgrade Set

Mouse wPC paintbrush

TANDON TM 100-2 DS/DD

disk drive 55B

disk drive TEAC 558 1/2 Height DS/DD

Daughterboard . .

Speed Key System

256K Memory set Intel 8087-3

Intal 80287 Quantity pricing evailable

Footmouse

MesterPiece

Koala Pad

ORCHID TECHNOLOGY PC Turbo 186 128K

AST RESEARCH 899.95 AST 6-PACK PLUS 64K For game port option add 34.95

Naw! Expanded Quadboard 64K 209.95 384K 249.95 189.95 92.50

nock OK Naw! J RAM 3 256K TECMAR

249.95 MEMORY EXPANSION CARD FOR THE IBM AT

Tecmar Maestro 640K **AST Advantage** Ouadram Ouadmeg 128K Tall Tree J RAM AT 512K

> MODEMS ANCHOR AUTOMATION

11 95 MAYES martmodem 1200 RS 232 399.95 martmodem 1200B

Smartmodem 2400 Baud NOVATION 1200 + Internel Moder 1200 + External Modern Novation 2400 Modern . 359.95 599.95

Includes Mite softwa VEN.TEL PC 1/2 Card Modsm-(Internal) w/Crosstelk XVI 389.95

MONITORS PRINCETON HX 12 RGB Color MAX-12 Amber TTL

795.00 QUADRAM Amberchrome 12" Amber 149.95 TAXAN 549.95 399.95 419.95 BoB board for 440 420-RGB color

AMDEK 600 Color RGB 700 Color RGB 710 Color RGB

BROTHER

COMREX CRII 19 CPS CR-3 23 CPS CR-IV 36 CPS

JUKI 6100 18 CPS Letter Quality 379.95 6300 40 CPS

QUADRAM QUADBOARD

TALLTREE SYSTEMS J RAM-2 wiparollel, serial &

CAPTAIN-64K CAPTAIN-384K 194.50

449.00

489 00 wloaraliel & serial ports

179.95 Volksmodem 12 Cable for PC, Compaq

with Smartcom II

1200 Plus External 300r1200 389.95

440 05 179.95 599.95 SR-12 w/Scan Doubler

425-RGB color 122-12" TTL - Ambe 121-12" TTL - Green Amber

419.00 509.95 PRINTERS

HR-15 17 CPS HR-25 23 CPS HR-35 36 CPS 369.00 649.00 Tractor Feed f/HR-15, HR-25 Sheet Feeder HR-15/25

EPSON CALL FOR OUR LOW PRICES

\$269500

 IBM PC 256K 10MB internal hard drive · 360K disk drive

. 1 2MB disk drive

\$224900 · 20MB internal hard drive

· 360K disk drive

APPLE Laserwriter

QUADRAM Quadlaser

SWEET-P 6 pen plotter SWEET-P 1 pen plotter

KODAK 514 1 170 to 1

POLAROID DS/DD

SOFTV

FLOPPY DISKS

For quantity prices please call

WE STOCK A LARGE SELECTION OF SOFTWARE

FOR TITLES NOT LISTED

HERE, PLEASE CALL US

FOR OUR LOW PRICES.

**HP** Laseriet

IBM 51/4

· 1.2MB disk drive

IBM PC 256K

\$289500

IBM-PC 256K

. 20MB internal hard drive + 2- 1/2-ht 360K disk drives 45MB internal cartridge backup system

· 140 watt power supply \$389500

IBM AT SYSTEMS

IBM AT Enhanced System (IBM Enhancement) . . . . Call IBM AT 512K with 51MB internal hard drive ..... 14795 IBM AT 512K with 72MB internal hard drive ..... 15049

ALPHA Keyworks "TOP RATED" ODEO letter quality Call 3550 letter quality 33 CPS APPLIED SOFTWARE 2050 letter quality 18 C Trector Feed 3550/2050 79 95 Versalorm XL ASHTON TATE OKIDATA OKI-192 349.95 OKI-193 OKI-93 569.95 OKI-84 D base II Ashton Tate D BASE III Ashton Tate Framework OKI-93 56 OKI 2410 1995.00

OLYMPIA BORLAND who Peeral 3.0 Compact R/O parallel/serial Side Kick (protected) latter quality 299.95 ide kick (non-protected) SILVER REED Turbo Pascal w/8087 support EXP 550 19 CPS EXP 770 36 CPS Tractor Feed for EXP-550 RRODERBUND

TEXAS INSTRUMENTS Bank ST Writer 54 95 855 with Tractor Feed 749.95 DATA TRANSFORMS TOSHIBA Fontrix Cati P 351 Printer (288 Cps) P1340 Printer 1149.00 579.00 DOW JONES Investment Evaluator **PLOTTERS** Market Analyzer area color cardi229.95 Call

Call

Cati

795.00

295.00

19.95

26.95

18.95

Market Manager plus Spread Sheet Link FOX & GELLER for D Base 139.95 Outck Coda Dutil D Graph\* 149.95 \*For D Base II or III Please specify OZ (reg. 256X & color card)

R Graph (for R Base 4000) **FUNK SOFTWARE** Sideways

HARVARD SOFTWARE Harvard Project Manager . . 209.95 New! Total Project Manager . 259.95 HARVARD ASSOC.

44 95

PC Logo. IMSI PC Paintbrush requires mouse & color cerd . . . . ..... 59.95

Internal Tope Backup Units require 130W power supply DISPLAY CARDS **EVEREX** 200 05 Graphics Edge

## At 47th St. Computer, of course! ....

#### COMPAQ PORTABLE SYSTEMS . Two DS/DD disk drives · Built-in hi-res monitor with graphics Parallel printer card Call or write. COMPAG PORTABLE HARD DRIVE SYSTEMS COMPAQ 256K with 10MB Drive and 1-360K Floppy ...... COMPAQ 256K with 10MB Drive and 2:360K 1/2 HI. Drives . COMPAQ 256K with 20MB Hard Drive and 1-360K Floppy ... COMPAQ DESK PRO. Call or write. MICROSCIENCE INTERNAL HARD DRIVES FOR IBM PC AND XT 20MB \$59500 10MR \$48900 FREE! ALPHA Keyworks Keyboard Macro Program with MicroScience 10MB or 20MB hard drive. A \$89.95 value TURN 1 IBM-PC INTO 4 inn your IBM PC or XT into a true Multi user system with Multi PC. Up to users can share a single PC, running the same or dillarent soltwa all under PC DOS Ideat for the small office Colf for low price. MSI CARTRIDGE BACK-UP SUBSYSTEM Now Only \$88888 Cornerstone Multimate Version 3.3 INNOVATIVE SOFTWARE Smart Software System tult Integrated Software OSPREY ACCOUNTING SYSTEM General Ledger Executive Presentation Inventory LIFE TREE Volkswriter Deluxe ... LIVING VIDEOTEXT Think Tank (req. 256K) ...... 109.95 Power Base 2.1.. PROGRAMMER'S CORNER C-Food Smorgasboo Morgan Prof. Basic attice Windows MENLO PARK Panel for Lattice C Halo Mattice C MICRO DATA BASE SYSTEMS Mate Taxt Editor Knowledge Men 1.7 . . . . . . 239.95 Plink-86 Overlay Linker Trieve Mark Williams C Wordstar 2000 MICRORIM R Base 5000 . Prokey 3.0 MICROSOFT SCARBOROUGH SYSTEMS Your Personal Network . . . . . New! Flight Simulator ... Multiplan Word 2.0 SOFT LOGIC Double DOS

MONOGRAM Dollars and \$en\$e wiforecast 109.95 MULTIMATE 249.95

NOUMENON

PETER NORTON

POWER BASE SYSTEMS

QUATERDECK

MON & SCHUSTER

SORCIM percalc 3 Release 2

69.95

219.95

219.95

SOFTSTYLE	THOUGHTWARE Sell! Sell! Sell! Sell .  VM COMPUTING Relay Communication .  WARNER SOFTWARE Desk Organizer .
STARBBIDGE TECHNOLOGY 39.95 STATE-OF-THE-ART The Bookkeeping System 39.95 General Ledger 399.95 Accounts Receivable 399.95 The Software Group Enable 399.95 THE SOFTWARE GROUP Enable 299.95	GRAPHIC SOFTWA Business Graphs 2 Overhead Express 1: BRIGHTBILL ROBERTS Grafix Pariner Grafix Pariner Energraphics PRENTICE HALL Execurision see color 28
IBM PCjr.  ALPHA Electric Desk PCjr.  MICROSOFT PCjr. Booster 128K RAM Mouse and Flight Si KOALA Koats Pad Touch Tablet fr	mulator

MICRO PRO WordStar for PCir.

NASSAU STREET STORE

Sell! Sell!
VM COMPUTING Relay Communication 99.
Desk Organizer
GRAPHIC SOFTWARE
Business Graphs 219.95 Overhead Express
BRIGHTBILL ROBERTS Grafix Partner
ENERTRONICS Energraphics
PRENTICE HALL Execurision and color cont . 269.95

134th 199

579°

67 W. 47th St. • 115 W. 45th St.

SORCIM Supercalc Superwriter for PCir.....

116 Nassau St. New City Hall and Trade Control

nex around the corner, 39 Ann Street Mail Order Address: 36 E. 19th St., New York, N.Y. 10003

IN NEW YORK 1-212-260-4410

TOLL-FREE 01-800-221-7774 45th and 47th ST. STORES

1-212-608-6934 1-212-398-1410 Store Hours: Sunday 10-4, Mon, thru Thurs, 9-6, Friday 9-2

No surcharge for credit cards

Prompt and efficient service

Knowledgable and experienced

sales staff. We accopt MC, Visa, American Epresa & personal checks for delays II opproved. Minimum sipping end handling '98. Software found to be defective will be replaced immediately. Detective hardware will be replaced immediately. Detective hardware will be repeated for replaced manual be seen to 98.6 as 11th Street, Mew York, NY 1000.3 Att Service Dept. Prices herein ser for mail and phose orders only, Store prices may difficult forms prices may difficult forms of the prices and the service of the servic

Not responsible for typographical errors.

Keep in touch with the tatest items on the market and our up-to-date sale prices by checking our weekly ads in the Netional editions of the N.Y. Times end Wall Street Journal.

PC Magazine bept 17, Submitted July 17, 1905.

The program offers eight fonts. One of these fonts is new with Version 5.1 and is really a collection of 94 symbols including weather, holiday, and transportation symbols. Some of these duplicate the graphics

re are 87 reasons to

symbols of the PC display, but no international alphabetic characters are available.

You have a choice of 16 character sizes, ranging from 13 characters per inch to 1½-inch per character. But the program t

Save 30% to 43%

warns that the smallest 4 of these sizes will not print well on the IBM Graphics Printer.

Sign-Master's screen preview feature is excellent. Despite the lower resolution of the IBM graphics display, the layout closely approximates what you'll see on the printed sign.

Sign-Master supports a wide array of printers and plotters. It also supports the Polaroid Palette and can create 35-mm slides.

The quasi-full-acrere cities has a display on the bottom showing the first, the size, the justification, and the color of the size, the justification, and the color of the character currently positioned by the cusor. This display also serves as a mens of selecting character attributes. It had a difficult time working with the editor, however, You can only make editing changes in the bottom line of the display, and so coalup help screens while using this program was when Jused the editor.

The editor uses some WordStar-like Ctrl-key combinations but not consistent-lilly. However, you may do extensive editing work outside the editor, using a menu to select lines for conversions of fonts, sizes, justifications, and colors.

Sign-Master's editor needs more work, but once you get used to it, the program is a joy to use and lots of fun. If you need to produce high-quality charts and signs for presentations or other applications, this program may be what you're looking for.—Charles Petzold



ELEKSTEK inc. 6557 N Lorent Art. Change J. 45

CIRCLE 123 ON READER SERVICE CARD

Sign-Master 5.1
Decision Resources
25 Sylvan Rd. S.
Westport, CT 06880
(203) 222-1974
Late Price: 5245
Requires: 192K RAM (256K for printers, 300K for color printers), DOS 2.0 or later, two disk drives. Color/Graphics display, optional for on-screen previews. For use

with most IBM PC-compatible printers and plotters, including printer models by IBM, Epson, Okidata, Toshiba, Panasonic, and Smith-Corona. Supported plotters include models from Amdek, IBM, C. Itoh, Epson, Hewlett-Packard, and Houston Instruments.

CIRCLE 800 ON READER SERVICE CARD

CHOLE 020 ON REALIER SERVICE CAR

MICRO CAP and MICRO LOGIC put your engineers on line... not in line.





MY OWN WORKSTATION



How many long unproductive hours have you spent "in line" for your simulation? Well, no more. MICROCAP and MICROLOGIC can put you on line by urning your PC into a productive and cost-effective engineering workstation.

Both of these sophisticated engineering tools provide you with quick and efficient solutions to your simulation problems.

And here's how.

#### MICROCAP:

#### Your Analog Solution

MICROCAP is an interactive analog circuit drawing and simulation system. It allows you to sketch a circuit diagram right on the CRT screen, then run an AC, DC, or Transient analysis. While providing you with libraries for deficiency of the control of the contro

productive. As an advanced version, it employs sparse matrix techniques for faster simulation speed and larger net-



works. In addition, you get even more advanced device models, worst case capabilities, temperature stepping, Fourier analysis, and macro capability.

#### MICROLOGIC:

#### Your Digital Solution

MICROLOGIC provides you with a similar interactive drawing and analysis environment for digital work. Using standard PC hardware, you can create logic diagrams of up to 9 pages with each containing up to 200 gates. The system automatically creates the netlist required for a timing simulation and will handle networks of up to 1800 gates. It provides you with libraries for 36 user-defined basic gate types, 36 data channels of 256 bits each, 10 user-defined clock waveforms, and up to 50 macros in each network. MICROLOGIC produces high-resolution timing diagrams showing selected waveforms and associated delays, glitches, and spikes-just like the real thing.

CIRCLE 497 ON READER SERVICE CARD



Typical MICROLOGIC Diagram

#### Reviewers Love These Solutions

Regarding MICROCAP... "A highly recommended analog design program" (PC Tech Journal 3/84). "A valuable tool for circuit designers" (Personal Software

Magazine 11/83).

Regarding MICROLOGIC..."An efficient design system that does what it is supposed to do at a reasonable price" (Byte 4/84).

MICROCAP and MICROLOGIC are available for the Apple II (64k), IBM PC (128k), and HP-150 computers and priced at 4475 and 4450 respectively. Demo

versions are available for 875.
MICROCAP II is available for the
Macintosh, IBM PC (256k), and HP-150
systems and is priced at 8895. Demo
versions are available for 4100.

Demo prices are credited to the purchase price of the actual system.

## Now, to get on line, call or write today! Cnactrum Caftwarea

1021 S. Wolfe Road, Dept. F Sunnyvale, CA 94087 (408) 738-4387



51/4" DSDD | Ony 50 These are poly bagged diskettes packaged with fiverk sleeves

SOFT SECTOR DNLY) Soid in multiples of 50 only INCOGMATION & FOR ORDERS ONLY 1-800-621-6827 1-312-256-7140

HOURS BAM SPM Central Time Monday Finday
WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE
DIN THE SAME PRODUCTS AND DUANTITIES! DISK WORLD!, Inc.

WORLD!

DISKETTES The great unknown!

You've used these diskettes hundreds of times as copy-protected originals on some of the most popular software packages. They re packed in poly-bags of 25 with Tyvek sleeves. reinforced hubs, user identification labels and

LIFETIME WARRANTYI SOFT SECTOR ONLY! Soid in multiples of 50 only INFORMATION &

1-800-621-6827 1,312,256,714D HOURS AMM SPM Central Time Monday WILL BEAT ANY NATIONALLY ADVERTISED PRICE DISK WORLD!, Inc.

#### DISKETTE STORAGE CASES

S9.69 ...

DISKETTE 70 STORAGE: STILL A GREAT BUY DISK CADDIES \$11.68 " \$1.65 ...

1-312-256-7140 BEAT ANY NATIONALLY ADVERTISED PRICE

1-800-621-6827

## FANTASTIC LOW PRICES ON

PACKED IN CARDBOARD CASES!

THE DISKETTES have a LIFETIME WAR sels and write protect tabs
SOFT SECTION ONLY! MINIMUM CROSER 20 DISKETTES BASE 3.5: MICRO FLOPPIES

BASE SWHIGH DENSITY FOR IBM PC AT 40000 135 TPI \$2.34 to DSD0 HD \$3 Mea FOR ORCERS ONLY. 1-800-621-6827 In Bross 1 312 756 7140) HOURS BAN SPM CHIOLE INFORMATION &

1-312-256-7140 WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES!

on Processing T BASE

DISK WORLD!

Ordering & Shipping Instructions

et chapping charges Payment vISA and MASTER of COO Orders. Add addedon visit to the CARD accepted CDD Orders Add address at \$3.00 Special dung charge APO FPO, AK, Hi & PR Orders Include shi charges as shown and addressal 5.5 oil lotal order amo PAL and insurance faxes illinois residents only add 75

Prices subject to change without notice This ad supercedes all other ads Not responsible for typographical entars MENALIM TOTAL ORIGIN \$35.00

FOR ORDERS ONLY INFORMATION 1-800-621-6827 INCUMES 1-312-256-7140

HOURS BAM SPM Coveral Time WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND DUANTITIES! DISK WORLD!, Inc.

WORLD

#### PRINTER RIBBONS:

at extraordinary

prices!

LIFETIME WARRANTY Epson MX-70/80 \$3.58 ea + 25¢ Shpng Epson MX-100 \$4.95 ea + 25¢ Shpng Okidata Micro83 \$1.48 ea + 25¢ Shpng \$3.66 ea + 25¢ Shpng Okidata Micro84 INFORMATION & 1-800-621-6827 INQURIES: 1-312-256-7140

WE WILL BEAT ANY NATIONALLY ADVERTISED PRICE
ON THE SAME PRODUCTS AND QUANTITIES! DISK WORLD!, Inc.

CIRCLE 244 ON READER SERVICE CARD



The best deal on 3M diskettes vou've ever seen!

FLIP N' FILE 15 with every order for 5.25" SSDD and DSDD.



\$1.42 ea. - 5 25" SSDD with FREE Flip in File 15 5 25" 08 00 with FREE Flip nº File 15 . \$ 1.74 ea. 100% LIFETIME WARRANTY

This is a Super Special promotion. It was supposed to end around the end of May

But we decided to buy more than 1,000,000 3M diskettes packed in the FREE Flip n' File 15's...and give you the benefits of this terrific value One word of warning: this offer is

limited only to supplies on hand. Once these supplies are used up, the prices stay the same...but there's no free Flip n' File. The last time we ran an offer like

this, everything was sold out in about six weeks. So don't wait. Order now.

Other 3M diskettes:

(Flip n' File offer does not apply.) 5.25" SSDD-96TPI ..... \$2.06 ea. 5.25" DSDD-96TPI ..... \$2.57 ea. 5.25" DSDD-HD for

IBM PC/AT . . . . . . . \$3.93 ea. 3.50" SSDD-135TPI for Apple Mac ..... \$2.86 ea.

#### DATA CARTRIDGES 100% certified 3M data cartridges DC-1000 ..... \$13.90 ea.

DC-300XLP \$19.83 ea. DC-600A \$22.13 ea. Sold in cases of 10 only.

Add \$5.00 shipping per 10

## **Getting Graphics** To Speak ASCII

Here's how to tame printers that can't handle the IBM PC's text graphics character set.

rinters seem to be an eternal source of frustration for most PC users. Besides the usual problems of changing messy ribbons, finding the right kind of tractor feed paper, and deciphering obscure escape codes, the lack of a standard for a full ASCII character set (256 rather than 128) more often than not means incompatibility between the IBM PC's extended character set and the character set your printer can produce.

Specifically, if you're like most PC users, your printer will not print the useful "text graphics" characters built into the PC. These characters, located in the upper part of IBM's character set, are used to create foreign-language characters or attrac-

140 Z#=Z#+VAL(AS)

150 NEXT:NEXT

## 1985/No. 19

tive rectangular shapes that can be filled with a variety of gray tones. Most applications programmers use those characters effectively to make their screen menus and

displays more attractive and organized. However, if your printer can't print the text graphics characters, getting a printed dump of those screens is a messy, if not impossible, business. Most printers print ordinary or special (e.g., italic) characters in place of the text graphics. Unfortunately, however, some printers simply crash

when confronted with IBM's character set. There's an easy fix for this problem, if

# NTRODUCING

NOW YOU CAN DO ALL THIS WITH OR WITHOUT A

GRAPHICS BOARD...

MONOGRAFX<sup>™</sup> ONLY \$6095 · Makes it easy and inexpensive to create organizational diagrams, Gantt charts, everyday husiness forms and other free form line and block drawings on your IBM PC

 Integrates graphics and text — including ASCII files created with other popular programs •Lets you use three different character

sizes (in normal or condensed print) on sheets as large as 11° x 14°. Supports over 50 popular printers, plus most monochrome and color/

graphics display adapters In short, MonoGrafx provides the features you need to create impressive

reports, presentations, proposals, hand-outs — even on-screen slide shows!

#### *TRY IT RISK-FREE!*

Send \$69.95 plus \$3 shipping (\$10 outside U.S. and Canada) to: Analytics International, Inc., 1365 Massachusetts Avenue, Arlington, MA 02174, (Mass.

residents, add \$3.50 tax.) MasterCard and VISA orders CALL TOLL-FREE 1-800-992-0085, (In Massachusetts, dial 617-641-0400.)

We'll rush you your MonoGrafs software package right away. If you're not completely satisfied, just return it within 15 days of delivery for a full. unquestioned refund or credit. Out guarantee is that pure and simple. ------

□ YES, please rush me MonoGrafx to try risk-free for 15 days. My check, money order or company P.O. is enclosed.

Send me more free information about your Software for busy people."

Title	 	 _
Company	 	
Chy		7

State .... Ext.

Analytics International, Inc. 1365 Massachusetts Avenue Arlington, MA 02174

170	PRINT	*ERROI	R: CI	HECK	THE	LAS
180	PRINT	"EACH	DATA	STA?	PEMER	T

160 IF Z#=20515 THEN RESTORE:GOTO 190 T NUMBER IN"

100 ' Program for creating PRSWAP.COM

THEN REDO": END

110 CLS:PRINT "Checking DATA; please wait..."
120 FOR B=1 TO 16:FOR C=1 TO 17

190 FOR B=1 TO 16:FOR C=1 TO 16 200 READ AS:TTL=TTL+VAL("&H"+AS)

210 NEXT

220 READ S:IF S=TTL THEN 250

130 READ AS: IF C<17 THEN 150

230 PRINT "DATA ERROR IN LINE"; B\*10+330 240 PRINT "CHECK FIGURES AND REDO": END

250 TTL=0:NEXT:RESTORE

260 OPEN "PRSWAP.COM" AS \$1 LEN=1:FIELD \$1,1 AS D\$ 270 FOR B=1 TO 16:FOR C=1 TO 16

280 READ AS: LSET DS=CHR\$ (VAL ("&H"+A\$)) 290 PUT \$1:NEXT:READ DUMMYS:NEXT:CLOSE

300 PRINT "PRSWAP. COM CREATED"

Figure 1: A BASIC program that will create PRSWAP.COM.

328 338 358 358 378 388 488 418 428 438 448 458	DATA DATA DATA DATA DATA DATA DATA DATA	7C, 2A, 77, 2C, FF, 53, 69, 74, 69, 20, 8A, A1,	7C, 2D, 2A, 1D, BØ, 1E, 57, 63, 65, 64, 50,	2A, 2D, 23, 3C, D7, 03, 41, 6B, 73, 65, 52, BA,	2A, 7C, 2E, 80, 5B, 50, 69, 20, 6E, 53, 6E,	2A, 2D, 7B, 72, EB, 80, 6E, 49, 74, 57, 81, 8C,	2A, 2B, 7D, 19, 89, 73, 6E, 20, 41, B4,	2A, 2D, 5E, 3C, 90, 43, 6F, 63, 50, 50,	2A, 2D, 51, DF, 3C, 74, 29, 6E, 2E, 6F, 20, NI,	2D, 2D, 33, 77, FE, 92, 20, 72, 4C, 21, 5E, FB,	2D, 2D, 69, 75, 8A, 31, 41, 8A, 74, 6F, 1E,	7C, 2A, 1E, 8A, C1, 39, 73, 24, 69, 61, B8,	2D, 2A, 0E, C8, 8A, 1F, 38, 73, 6F, 64, 80, A3, 9B,	2B, 2A, 1F, 53, 68, 6F, 6E, 65, 81,	7C, 2A, 80, BB, CF, 2C, 63, 52, 20, 64, 8E, 91,	7C, 2B, FC, 87, 3D, 50, 69, 65, 6F, 8D, C7, 09,	2A, 2B, 00, 91, 9C, 52, 44, 61, 73, 66, 8A, FA, CD,	1092 778 1295 1554 2088 1684 886 1601 1072 1556 1149 1592 1125
																	(Fie	ure I ands
	320 330 350 350 370 380 490 420 420 440 450	320 DATA 330 DATA 340 DATA 350 DATA 370 DATA 380 DATA 480 DATA 480 DATA 420 DATA 430 DATA 430 DATA 430 DATA 430 DATA 430 DATA	328 DATA 7C, 338 DATA 2A, 348 DATA 2A, 358 DATA 77, 368 DATA 77, 368 DATA 53, 398 DATA 53, 398 DATA 69, 488 DATA 74, 418 DATA 69, 428 DATA 28, 438 DATA 8A, 448 DATA 8A,	328 DATA 7C, 7C, 338 DATA 2A, 2D, 348 DATA 2A, 2D, 358 DATA 77, 1D, 368 DATA 77, 1D, 368 DATA 2C, B8, 378 DATA 53, 57, 398 DATA 69, 63, 488 DATA 74, 65, 418 DATA 69, 64, 428 DATA 8B, 24, 448 DATA A1, 5C, 446 DATA A1, 5C, 458 DATA 5C, 88, 458 DATA 5C, 86, 46, 468 DATA 5C, 86, 46, 46, 468 DATA 5C, 86, 46, 46, 468 DATA 5C, 86, 46, 468 DATA 5C, 86,	328 DATA 7C, 7C, 2A, 338 DATA AC, 7D, 2D, 23, 348 DATA 2A, 2D, 2D, 2D, 356 DATA 7T, 1D, 3C, 366 DATA 2C, 88, D7, 376 DATA FF, 1E, 83, 389 DATA 53, 57, 41, 399 DATA 69, 63, 68, 480 DATA 74, 65, 73, 418 DATA 69, 64, 65, 428 DATA 28, 58, 52, 438 DATA 31, 5C, 68, 448 DATA A1, 5C, 68, 458 DATA A1, 5C, 68, 458 DATA 5C, 68, 37, C, 68,	328 DATA 7C, 7C, 2A, 2A, 2B, 2B, 2A, 2D, 2D, 7C, 348 DATA A2, 2D, 2D, 7C, 348 DATA A2, 2D, 2D, 7C, 348 DATA A2, 2D, 2D, 7C, 349 DATA A2, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2	328 DATA 7C, 7C, 2A, 2A, 2A, 23, 38 DATA 2A, 2D, 2D, 7C, 2D, 338 DATA 2A, 2D, 2D, 7C, 2D, 338 DATA 2A, 2A, 2B, 7B, 7B, 7B, 7B, 7B, 7B, 7B, 7B, 7B, 7	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 3A, 338 DATA 2A, 2D, 2D, 7C, 2D, 2B, 2D, 328 DATA 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 32, 38 DATA 2C, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2D	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 338 DATA 2C, 2D, D, 2D, CD, 2D, DD, 2D, 2D, 2D, 2D, 2D, 2D, 2D, 2	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 2D, 328 DATA 7C, 2D, 2D, 7C, 2D, 2B, 2D, 2D, 2D, 2D, 2D, 2A, 2A, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 2D, 7C, 2D, 338 DATA 2A, 2D, 2D, 7D, 2D, 2B, 2D, 2D, 2D, 2D, 2A, 2A, 248 DATA 2A, 2A, 2A, 2B, 2B, 7B, 7D, 5E, 51, 33, 62, 1E, 6E, 2B, 4B, 4B, 4B, 4B, 4B, 4B, 4B, 4B, 4B, 4	328 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 2D, 2B, 338 DATA 3A, 2D, 2D, 7C, 2D, 2B, 2D, 2D, 2D, 2D, 2A, 2A, 2A, 2A, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B	238 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 2D, 2B, 7C, 338 DATA 2A, 2D, 2D, 2D, 2B, 2C, 2D, 2B, 2D, 2D, 2D, 2D, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2A	238 DATA 7C, 7C, 2A, 2A, 2A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 7D, 2B, 7C, 7C, 2D, 338 DATA 2A, 2D, 2D, 7C, 7D, 2B, 2D, 2D, 2D, 2D, 2D, 2A, 2A, 2A, 2A, 2A, 2A, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B	318 DATA B5, BF, 88, 88, 88, 88, 88, 88, 26, 25, 48, 7C, 7C, 7C, 7C, 2A, 2A, 238 DATA 7C, 7C, 3A, 3A, 3A, 3A, 2A, 2A, 2A, 2A, 2D, 2D, 7C, 2D, 2B, 7C, 7C, 2A, 2A, 2B, 2B, 2A, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B, 2B

you're willing to use the ordinary ASCII character set to simulate the text graphics characters. All you need in such a case is a resident program that intercepts characters on their way to your printer and substitutes

an ordinary character for each text graphics character that comes its way. I call the program to do this Prswap. A BASIC program that will generate

PRSWAP.COM directly when you run it

once (you won't need to use BASIC thereafter) is shown in Figure 1. Because of the large number of DATA statements (which you enter in hex, as shown), both overall and line-by-line checksums are included,

#### 9-TRACK MAG. TAPE SUBSYSTEM FOR THE IBM PC/XT/AT



For information interchange, backup and archival storage, IBEX offers a 9-track, IBM format-compatible '%" magnetic tape subsystem for the IBM PC, featuring:

- # 42 M-Bytes on a single reel. # IBM format 1600 cpi.
- Software for PC-DOS, MS-DOS.

### IBEX

1BEX COMPUTER CORP 20741 Maritle St., Chatsworth, CA 91311 (818) 709-8100 TWX: 910-493-2071

CIRCLE 143 ON READER SERVICE CARD

### MICROS IBM PC; IBM XT IBM AT



•Rentals

• SONY 25" Video •Installation

 Service
 Law yearly, manthly and weekly rental rates

We rent modems, HP plotters, dot matrix and letter quality printers. Immediate Delivery!

609-662-1010
MICRORENTALS
Visa and MasterCard accepted

CIRCLE 332 ON READER SERVICE CARD

## COMPLETE YOUR LIBRARY OF [1]

Add to your PC collection today. More your personal library complete and authoritative with any issues you may be missing.

Copies are avoilable for issues published during the last twelve months—be sure to specify the issues you wont. If a particular issue is aut of stock, your payment will be refunded promptly.

Back issues of PC are priced at \$6.00 each,

Back issues of PC are priced at \$6.00 each, postpord. Outside USA, \$7.00 each.

ſ	PC
ı	Ziff-Davis, One Park Avenue, 4th Floor,
	New York, NY 10016, K. Armstrong

New York, NY 10316, K. Armstrong
Please send issues of PC Isrted below
Issue Qhy. Unit Price Tol

-	1220e	Cery.	One Price	TOTAL PRICE
		T		
ı		1		
		Paymen	f Enclosed	s
		_		

Mr./Mrs./Ms.

City/State/Zip

#### LETTRIX™ Improves PC Printing

With LETTRIX™ your <u>Epson</u>, <u>IBM</u> <u>Graphics</u>, <u>Okidata</u>, <u>Gemini</u>, or <u>Panasonic</u> can print proportionally-spaced letter-quality text <u>directly from all software</u>.

Before: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef After: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdef

LETTRIX\* resides in your PC's memory between your software and printer, responding automatically to spacing, paging, margins, boldfacing, <u>underlining</u>, *italics*, <u>subscripts</u> and <u>superscripts</u>. Just print as you would normally. LETTRIX takes care of the resti

"A fun program that is easy to use." -- PC WEEK
"The sharpness and clarity nearly equals that of an
expensive daisy wheel printer." -- THE NEW YORK TIMES
"Surprisingly low price." -- BOARDROOM REPORTS

You can design your own characters on any display, or use the twenty different typefaces included: Broadway, Courier, Old English, Art Deco, OWTLINE: BEEREEKE, Engraved, Park Deco, OWTLINE: NAKODW, ROMan, BANKER, Gothic, Prestige, Folio, ORATOR, OCR-A, and the entire IBM foreign language and lime-drawing character set:

$$\frac{k}{\sum_{n=1}^{\infty} \alpha \beta \pi^2 \theta} \frac{(\mu + \beta)}{6.718} \approx \int \left[ \frac{\partial^3 u}{\partial t^3} + u \frac{\partial u}{\partial x} \right] + \frac{Ax \cdot u}{\sigma \mu / t}$$

Français, Español, Italiano, Deutsch, Ру́ссий, Έλληνικός, פאי לטריקס פי לטריקס יפה.

You can control LETTRIX features either by accessing a menu that pops-up over your current software, or by placing simple single-character commands in your text.

LETTRIX requires an IBM PC, XT, AT, or compatible with 60kb of free memory, and DoS version 2.0 or greater. Have your dealer order LETTRIX from us for you, or call us yourself toil-free at (800) 351-4500. LETTRIX™ costs just \$98.50. We pay UPS shipping.

MasterCard and Visa accepted. Foreign orders: add \$10. Call and mention PC Magazine for a free print sample.

This entire advertisement is an actual-size, unretouched column of text printed directly from a wordprocessing program on an EPSON RX printer controlled by LETTRIX™.

HAMMERLAB CORPORATION 5700 ARLINGTON AVENUE (203) 776-5699 RIVERDALE, NEW YORK 10471

making it easy to catch any typing errors. Alternatively, both PRSWAP.COM and/or PRSWAP.ASC (the BASIC program) can be downloaded via modem from PC Magazine's Interactive Reader

Service, by calling (212) 696-0360. The assembly language listing for Prswap is too lengthy for inclusion here. You can obtain a copy, however, either by downloading it from PC-IRS or by sending a request with a stamped (2 stamps, please) self-addressed envelope to: Technical Editor, PC Magazine, One Park Ave., New York, NY 10016. The .ASM version of Prswap can be assembled using either IBM's or Microsoft's assembler. Once assembled, you simply link it and use EXE-2BIN to convert Prswap to a .COM file (be sure to rename the PRSWAP.BIN file output by EXE2BIN to PRSWAP.COM). IEd. note: John's original article on Prswap contained an extensive analysis of the source code, which will be included

#### Making Modifications

Prisway should about your PC. (An AUTOEXEC. EAT entry does the job perfectly). The command will work with any printer directly as written, though if you wish to use different substitution characters, you'll have to make some modifications. In the assembler version you can simply change the characters in the SWAP\_TABLE, for example.

both on PC-IRS and with mailed copies.

If you don't want to reascemble the prome act time you change it around, or you've only downhoated the .COM file from PC-IRS, you can use DEBUG to longe SWAP\_TABLE. It's located at offset 107 in PRSWAP.COM, so you can enter your charactes there. If you've armitious, you can expand SWAP\_TABLE and modify! Prswap to substitute even the characters in places where you're not getting what you'd like on your printer.

Whatever you do, however, if you change the characters in SWAP\_TA-BLE, be sure to maintain their sequence rigorously and to use correct values for LOWEST\_CHAR and HIGHEST\_CHAR.

John Dickinson is a contributing editor for PC Magazine.

PC MAGAZINE • SEPTEMBER 17, 1985

Calife Sals



## All Prices Include Free Shipping!!!



## Mercury Hard Disk for the IBM PC

Convert your PC to an XT with our Mercury hard disk kits. Complete with cables, manuals, mounting hardware and easy-to-use software. Plus a one year warranty!

Mercury PC-10

\$395 \_\_\_\_\_\_\_\_

Mercury PC-30

Mercury Hard Disk for the IBM AT...

Enhance your basic IBM AT with our state-of-the-art Mercury AT hard disks. Complete with cables, manuals, and mounting rails. Includes a one year warranty!

Mercury AT-20 Mer

\$559

te-of-the-art
es, manuals,
entyl

Mercury AT-30 \$729

AST SixPakPlus
The World's best multithatetion board for

The World's best selling multitunction beard for IBM PG. Complete with 384K Memory, serial port, perallel port, and electronic disk and print buffer software.

\$269

10 MB Hard Disk

Mercury

for the

Portable

\$475

Mercury Tape Back-up

by Interliyee

\$395

### AST Advantage!



d offering up to 1.5 MB ory, serial port and parall

\$399

135 Watt Power Supply Teac 55B Half Height Memory
1 Year Warranty
9 Chips per set
64K......\$8
256K....\$39

Intel Math Co-Processor 8087 .... \$98 80287.. \$219 360K Floppy Drive for the IBM AT Total Power Protection!
Backnots Surpes
Holeragions Socies
Brownouts Military Note
Mil

## orporate & Institutional Accounts Welcome...





Softwa	are
MicroPro WordStar Pro Pak	
WordStar 2000 +	\$315
MicroSoft	\$259
Ashton-Tate	\$379
Boriand TurboPascal	\$39
Crosstalk	\$129
Hayes Smartcomil	\$110

Printers	Boards	Diskettes
EPSON'	Hercules Monochrome	CDC D/S\$15 3M D/S\$28
LX80\$229 FX80\$349 FX185\$499 LQ1500\$929	Graphics Card\$319 Color Graphics Card\$165	3M S/S
Okidata  окі 192	Princeton Graphic Systems Princeton Graphic Systems HX 12 ColorMonitor	Hayes Smartmodems 300\$159 12008\$359 1200\$389
NEC e-i-f\$459 HEWLETT PACKARD	Amdek 310A Monochrome Display \$175 Amdek 300A Amber Composite Display \$159	2400
2 pen, serial\$829 HP7475 6 pen, serial\$1419	Quadram Amberchrome Amber Monochrome Display	Deluxe Keyboard \$189 Rolltop 100 Diskette holder \$29
RETAIL OUTLET BETAIL OUTLET	RETAIN ONTLET	RETAIL OUTLET RETAIL OUTLET

Our Policy: All prices include fully insured, UPS gri VISA, MasterCard or UPS COD payments (Minimum p purchase orders on a net terms basis (with credit app

service required to keep your business running amouthly. We accept P.O.'s on a net terms basis, (min next day shipping, free full) intered UPS ground shipment. We offer a full-time technical staff to answeries and to make fast repairs if needed. You'll notice the difference.

For product information, price quotas, technical support and orders call: 800) 531-5475 (outside Texas) (512) 250-1489 (within Texas)



CompuAdd Corp. 12103 Technology



 Low Low Prices No Surcharge for MasterCard and VI
 Open 9 AM to 7 PM Eastern (Mon-Fri
 AM to 2 PM Eastern (Sat)

1-800-237-4048 (ORDERS ONLY)

<ul> <li>COMPUTERS</li> </ul>	•
IBM ENHANCED AT	5355
IBM ENTRY LEVEL AT	3647
IBM PC, 1 DSDD DR, 256K	1595
IBM PC, 2 DSDD DR,	
256K	1705
IBM PC, NO DRIVES, 64K	1205
IBM PC, 2 HALF/HYTES,	
256K	1631
IBM XT, 1DSDD DR/10MB, 256K	2255
IBM XT, 1DSDD DR/ TAN	DON
HD, 256K	2108
COMPAQ, 2 DSDD, 256K	0165
ACCOUNT	2133

<ul><li>MONITORS</li></ul>	
AMDEK 300G	116
AMDEK 300A	132
AMDEK 310A	143
AMDEK 600 RGB	
COLOR	407
AMDEK 710 SUPER	
HI RES COLOR	523
IBM COLOR	605
IBM MONOCHROME	231
PRINCETON MAX-12	154
PRINCETON HX-12 RGB	154
COLOR	446
PRINCETON SR-12/SCAN	440
DOUBLER	Enc
OLIADBAM	3/2

#### AMBERCHROME .... 171 OUADCHROME II . . . . 424 MISCELLANEOUS

MEMORY, 64K CHIPS .		
MEMORY, 256K CHIPS		
PRINTER CABLE		
MICROFAZER BUFFER,		
8K		•

OUADRAM

**O** 



MICROFAZER BUFFER. . 212 VERBATIM, DSDD DISKS 20

#### DISPLAY CARDS STB SUPER HIRES 400 . 402 HFRCULES COLOR..... 145 IBM MONOCHROME . . . 215 IBM COLOR . . **EVEREX GRAPHICS**

EDGE	325
GENOA SPECTRUM	295
TECMAR GRAPHICS	
MASTER	459
ARADISE MODULAR	
GRAPHICS	261

#### · BOARDS ·

A OTT OR UP A OUT THE LINE
AST SIX PACK PLUS,
64K 248
AST MEGAPLUS, 64K 281
AST MP-2, 64K 228
AST ADVANTAGE, 128K . 384
AST I/O PLUS 122
JRAM-2 169
QUADRAM QUADBOARD
ØK 240
QUADSPRINT 418
TECMAR CAPTAIN, ØK 219
TECMAR FIRST MATE

ØK	200
TECMAR WAVE XT, 64K .	187
TECMAR JR CAPTAIN,	
128K	295

#### MODEMS HAYES HAYES HAYES

HAYES

HAYES

VEN-TE

VEN-TE

39

10

SOFT

2400	
300	
300/1200	407
1200B w/	
WARE	380
1200B	351
LHALF CARD	374
L 300/1200	
RNAL	341
ACH HALF CARD	

#### AST RE 1200 ...

#### · PRINTERS ·

UNIDAIA SOA, WIDE
CARRIAGE 545
OKIDATA 84P, WIDE
CARRIAGE 660
OKIDATA 92P 385
OKIDATA 93P. WIDE
CARRIAGE 602
OKIDATA 2410P 1782
OKIDATA 182 215
OKIDATA 192 363
OKIDATA 182S 259
OKIDATA 184 660
EPSON FX-80.
TRACTOR 382
EPSON LX-80 248
EPSON FX-185, WIDE
CARRIAGE 417
EPSON FX-100, WIDE
CARRIAGE 531
EPSON JX-80 COLOR
PRINTER 531
EPSON LO-1500
PARALLEL1042
NEC 2050 682
NEC 3550 1045
NEC 8850 1458
JUKI 6100
II IKI 6300 cor

#### ACCESSORIES OKIDATA 82/92

TRACTOR 44
NEC BI-DIRECTIONAL
TRACTOR 151
NEC CUT SHEET GUIDE . 63
JUKI 6100 BI-DIRECTIONAL
TRACTOR 105
JUKI 6300 BI-DIRECTIONAL
TRACTOR 124

1-800-237-4048

IN FLORIDA CALL 813-493-2736



PC SYSTEMS

# SHOP AROUND.

THEN CALL PC AMERICA AND SAVE



PC AMERICA — offering quality product, prompt expert service and full manufacturer's warranties at money saving prices.

TAPE BACK UP SYSTEMS

1. IBM PC w/256K, two 380K dt, controller, keyboe		1. EVEREX 45ME 'L" remaining tops backup resent	11029.00	MONOCHROME	
2. IBM PC w/256K, two 380K dr. mons monitor, ad	ep \$2005.00	2 EMERALD KIMS N° streaming tape backup mermel	01005.00	1 1998 Moredvone green TRL egut, non-glare tube	1205.0
3 IRM PC w/250X one 300X or TIME reportions to	FO12245.00	3 SERVICE MAGINETICS TIME tops backup, It HT low power	9450.00	2 AMBER 26A under TTL, non-plans tube	. \$140.0
4. IBM PC w/256K, two 360K dr. grah od	42475.00			3 TAXAN \$1/92 sinker in green, TTL, non-gibre tube	<b>0148.6</b>
5 IBM PC w/360K dr. TMR 12MR Room	62735.98			4 PRINCETON GRAPHICS MAX 42, umber 800 PALES	0187.5
	42/36.00	CHIPS		E. COADRAM Amberchrome TTL, input, non-clare tube	0155.5
5. COMPAG DESK PRO w/640K, two 360K dr.		1 EAT TO come promis SEM PC chiese area chiese	415.00	2. SARTO 2" Inferror text EM competitie	398.6
TIMB herd disk	\$2845.00	2 DRX Till seen seconds (All FAMI) see ches	41.00	HI RES COLOR MONETOR	
7. COMPAG PORTABLE w/640K, one 360K dr.		1 SSE SE non servedo bido rhinti	111.00	7. AMDEX COLOR FOR MAD X 740 RGB when butter madel	9498.6
TOARS hard disk	\$2995.00	4 8087-2 ribid PC, XT, AF, COMPAC Mark Co-Processor	4112.00	E PRINCETTON CRAPMICS HCC (ISS) X 242 SCR.)	9495.6
E. IBM XT w/256K, one 360K dr. 10W8 hard dail di	12985.00	5. BIEZ-1 USM PC, XT, AF, COMPAC Main Co-Processor	4125.00	5 TAXAS	
R 1836 PC w/756K, two 360K dr. 20MB.		S. RICHT Co Processor	9231.00	KON SAD X DAD RGB	6469.5
45MB/BU, TSOM/PS	14095.00	E BOOD LO PROMISE	1441.00	425 BM PC competitio, where button	9474.1
	14039.00	MULTIPUNCTION BOARDS		10 COLORAN	
10. IBM AT w/ST2K, one 360K dr, 1,2MB,		MULTIPURCTION BOARDS		DUADORCHE KILD HEED X 460 HEED	9495.0
20MB herá diek dr	. \$4545.00	1 ACT DEDEADOR		SUPER HI BES COLOR MONITOR	
		SY PAC white (fee Mac)	4755.00	SUPER IN RES COLUM MUNITUM	
FLOPPY DISK DRIVES		SIX PAK W/384K S.PC. oor carne	1295.00	CROS 70 (72) X 481 SGS ann-siam con-Sideri	9579.5
I DOLL! DIVE DETATE			CSI 1291.00	COLDY / TO 1/23 A 483 Non, Non-gairs, non-mount	9978.8
DESIGNATION OF STREET			COM 21112.00	12. SALKAR 440 (730 X 480 RGB, nen-plans, non-Sicker)	9995
1 TEAC SER WILL IN HE Book did dies	9117.80	ADMITME AT comunity menory expension wiscost 128		11 SHORESTON CRAPMICS	****
2. MITTERSHIP SECK, Yo HT foody disk drive	1199.00	7 Present		\$3.0 600 X 460 co-statuted 760 w 2049 007	8879
3 SHORART MOX. To 67 Seems disk drom	9117 80	PC/Short Memory (G-3540) 4" X 5" short sim	9133.00	24-5 alife y elin stor-unisations selve as trees ons	98293
4 TARROSE NEX 15 4T from disk diver	9125.06	Mono Combo Card 15-3560) S Promo adverse non C/C	4394.04		
5. TRADOG WITE AN HT Super data dram	1122.00	Color Combin Cont. (5.3641) S.P. ROS votor over. C.C.	4200.00	MODEMS	
HOLH DENSITY FIDERY DISK DRIVES		1 That There	7222	1 march	
S. TEAC F. MS. Y. W. Some disk dive	4139.00	JAAM I IDOME NAME on DC PS	9192.00	NATES SMARTMODEW (2008 Greened 200/200)	
7 TEAC & 15MR % HT from 6th free	4154.00	J Colores incompley and and softwared 1 2000 draw	1302.00	NATE SWANDOOR STOR INVINE 200 200,	1201.0
E TEAC SE LEME/I ME N HT COME	4178.00	4 DISTRICT		2 VENTEL SHOP CARD wiControls DRI buffors	9427.5
B TALL TREE J-Datems control card+software	9217.80	229.2 MEET NOT A SECURITION OF	4743 BE	5 AERIEF DON COO MCORRIN DIVIDUAL	PELLA

#### HARD DISK DRIVES

	1405.00
	1300.00
3. EXPERANT witerral card	1485.00
4 SEABATE relcontrol conf	1200.00
5. BODDEE extented continuate shock mount	1005.00
Choose control cords from, Folcon, Adaptec, Worters Digital	
OTC, and XEREC.	
20MB N MERCHT	

2 SEASATE witcomed card, access time IOns 2 TULIS witcomed card, access time BOns 8 INCRESCIENCE wicewool card, access time 80mil WO FULL HEIGHT ME whencel card, access time Stinis. 11 TILLS worted out, so

ONE RULL HEIGHT 12 SEASATE reform CANCEL INC. SEASON SEASATE reinanted cord, access time Minds
INDOME witcomed cord, access time Minds
All drives include, researcing bardware, califes, a
CHERNALD SYSTEMS VIDMS externed with store
EMISAAD SYSTEMS WIDMS externed with store 1179.00 17. HERBOULLI TECH ENB of DULLI TECH 20MB ran

SIS w/70wert PS, ceble/card

1200.00

EXPANSION CHASSIS

DELECTIONS CHARGES
2 BROMA DESCRIPTION OF STATE AND ART STATE ART STATE AND ART STATE AND ART STATE AND ART STATE AND ART STATE

Allow one week for company checks to clear

5. Corporate, government, and restructional purchase ag S. All name shapped meural, air shipments take proving 3. All products fully warranted

000ATO WHA ISH-38HK, S,FC/G GLACMES (A? memory expension up to 4MS AEPOST LAT serial and pa

RECEIVED A RECEIVE WANTED TO TAKE HANDOOD IN BACK

9294.00 9100.00 QUANTERSYTE IS-\$1200 Inwa quantersystem to 78000 SUPER 1.0 I Sensi opt. S.P. G.C.C.

MONITOR ADAPTERS 1 898 Manachrane Adaptor 2 MERCULES Graphic Card Sister compo 3 PERSYST Mone Card/Parallel Fort 4 AST M3W00AAPPLIS, trearechrone 5 TERRE LARS ULTRAPAK (ESZ col. monographics, S.P.C.C.) ULTRAPAK OR ULTRACKSK (opnore for ULTRAPAK)

SIGMA 400 Card ITS shades color) opt pair GUADRAM GUADCOUDT 1 6 2 luppradable color cards

1300.00 MICCLEAR GRAPHICS, 10pt 1 (53,0) logs 8.0-3846, C. Feogry C.) 4238.86

STR GRAPHICS PLUS II Imenestrator, P. S4C pt 14 EVEREX GRAPHICS EDGE Color/Montal TS2 and

FAST SHIPMENT HOTLINE PHONE: (ORDERS ONLY)

DUTSIDE CA: 1-800-654-5365 INSIDE CA: 1-714-557-3903 Hours: M-F 8:30 - 5:30

Sat 10:00-2:00 CIRCLE 204 ON READER SERVICE CARD

MONITORS

SYSTEM ACCESSORIES

TO West Power Supplies . Till West Power Supplies Surga Protectors 14-6 outlets! ETYTORE OR SSI Keeboord

DISKETTES/CRETEIDGES ES/00 seh seens M250W 10/141.00 High Deneity AT discurren

%" Data Carmoja 460' length...... 14.º Data Cannoga 800' langth. PRINTERS

MONTHLY SPECIALS PER XT IRM PCXT compatible 256K 1 TFAC 558. 135 w/PS, 8 slots, one year werranty

KIDATA OKIMATE 28 COLOR PRINTER Natus 7 X 16/14 X 16, 80 col, ebben transfer, plug n print rfsca, 80/40 CPS PER XT OFFICE SYSTEM 256K, two TEAC 558's. TAXAN 121 More menter and card SHIEA 361 Private AGATE 25MB AT Drive (Stinks acce sufty upped Falton cost cost

Fountain Valley, CA 92708

COMPAS as a received of Compag Company Corporation



# dBASE-III<sup>™</sup> POWER TOOLS

FOX&GELLER

From the Enhancement Specialist

#### QUICKCODE-III<sup>ne</sup> dBASE Program Generator

The most popular dBASE enhancement in the world for over 3 years! Here's why:

QUICKCODE-III writes up to 15 different kinds of dBASE programs for you automatically. They are complete programs: bug-free, and well-commented. Beginners can run them the very first day Experienced programmers can eliminate 70%

- or more of coding time.

  Data entry forms with advanced line and box drawing
- features

  Computed fields and totals (using any formulas) on all forms
- Three types of data entry error checking (list, range, file)
   Three new data types not found in dBASE

**dNFWS** 

- (phone, SSN, money)

  Link together up to 8 databases
- automatically using relations

  Automatic Menu Generator
- "...it succeeds edmirably"—Infoworld
  "Thenks Fox & Geller!!!"—Ashton-Tate

dUTIL-III"

dBASE Program Utility

in just one place.

Double your programming productivity with dUTIL-III.

dUTIL finds program errors (such as unclosed IF, DO.

INCLUDE feature lets you store commonly used routines

and CASE), cleans up code, speeds up programs.

#### QUICKREPORT dBASE Report Writer

The most powerful report writer ever found on a micro:

- Connect up to 6 databases in one report!
   Break on up to 16 fields, with unique headers and footers.
- for each field

  TOTAL, COUNT, AVERAGE, MIN, MAX on each field
- Define your own computed fields—as many as you need
   Built-in high speed sort on up to 16 fields
- Use special printer features (e.g. BOLD) anywhere on recorts
- Complete line and box drawing capabilities
   Easy to use pull-down menus, work like Framework,
- Macintosh
   Run reports from within dBASE

"In my 30 years of experience with computers, I find that CUICKREPORT is the most versatile, essiest to use, and most exciting piece of software I have ever had the pleasure of encountering."

—W. Woodson. consultant

QUICKINDEX\*
ligh Speed Indexer

NEW

Index dBASE files 10 times faster than dBASE-III or dBASE-III

dGRAPH-III\*\*

dBASE Graphics System

Charlotte NC

- Like REFLEX, dGRAPH can cross-tabulate data
   Tabulate data using range or list matching
- Graph computed values using multiple fields
   High quality pie, bar, and line charts
- Nign quality pie, bar, and line charts
   Output to printer, plotter, or CRT
   ZOOM and AUTOGRAPH features let you adjust scales

Available from your local dealer

Versions available for dBASE-II

FOX & GELLER

800-221-0156 IN NJ (201) 794-8883 VISA. MASTER CARD accepted 604 MARKET STREET ELMWOOD PARK, NEW JERSEY 07407



TM-QUICKCODE-III,QUICKREPORT,QUICKINDEX,dUTIL-III,dGRAPH-III of Fox & Geller dBASE-III, dBASE-III, Framework of Ashton-Tate, Macintosh of Apple Computer, REFLEX of Analytics Corp.

# Spreadsheet Clinic

This forum offers our readers an opportunity to exchange the quick fixes, simple solutions, and fancy footwork that they've developed to make their spreadsheets work better.

#### **Building a Range Name Table**

If you work with large spreadsheets with many range names, it can be hard to keep track of them. By hitting F5 and then F3. the range names will appear in the control panel, but it can be cumbersome to scroll through them all, looking for the one you want. I have written a utility macro that not only creates range names, but builds a table of names with a description of the contents of each range.

Figure 1 shows both the macro and the kind of table that it builds. When you set up the heading for the table (lines 3 and 4), it's a good idea to make column D 16 characters wide. That lets you enter range names as long as 1-2-3's maximum of 15 characters, with one extra character for separation. The macro requires 3 specified range names. Cell C3 must be called Range Names, cell E18 must be Range-Name:, and E21 must be Scratch.

You run the macro whenever you are about to name a range. Put the cursor on the top left cell of the range and invoke the macro with Alt-T (for table). The macro will prompt you for the range name and a brief description of its contents. It then creates the range name you entered, and ends by letting you define the range by "pointing" with the cursor and hitting < Enter>.

Lines 5 and 6 of Figure 1 are samples of the kind of information you might put into the table. In a real worksheet you would locate the table so as to leave many lines free for adding new ranges.

Peter Lance Segall New York, New York

In an earlier column (PC Magazine, Vol. 4 No. 16), I included a different macro that builds a table of named ranges. It was based on a routine that prints out the cell addresses of named ranges. If Mr. Segall's macro incorporated this routine, the table

in Figure 1 would include a column giving the cell addresses of each named range as well as a description line.

#### Multiplan Printer Codes

In the Spreadsheet Face-off article in your issue of May 28, 1985 (PC Magazine, Volume 4 Number 11), I noticed that the Wharton team had trouble getting Multiplan to send control codes to the printer. I've had that problem too, and I didn't get any help from Microsoft when I wrote them. I figured out the problem, though, and thought I'd pass along what I learned.

There is a misprint in the section in the manual called "Printing Multiplan Files." First we are told that 'I is the printer setup string for the escape character and then we are told that it is 'l. The manual got it wrong the second time. Also, to get the " symbol, be sure to type a caret (shift 6) rather than the Alt key. The same caret symbol, immediately followed by another character, is also the equivalent of Ctrl plus

that character. Thus 'J is Ctrl-J.

Since the manual is very short on examples, you will probably have to experiment until you learn how to make Multiplan work with your printer. For the Epson MX series, for example, you have to send a decimal 15 (Ctrl-O) to turn on compressed type. To get this, you would enter 'O as the printing option. To get double-strike, you need to send the printer an Esc plus the letter G (not a Ctrl-G). You get this by entering '[G. For compressed type on a Centronics

737, you need an Esc followed by decimal 20 (Ctrl-T). Enter "I "T. For either printer, nutting a caret ahead of the ASCII character has the effect of subtracting 64 from its decimal value. If there is no caret, the AS-CII value passes through with its decimal value unchanged.

These tips and a little trial and error should go a long way. Ronald Hands

Hamilton, Ontario



Figure 1: A macro to build a table of range names and descriptions.

```
c
            THIS IS FOR INITIALIZING THE WORKSHEET
        (HOME) 8"/RPF6" (RIGHT) USE THIS AS A DUMMY STARTING LINE(LEFT)
        /RNCB TOWN OWN DOWN DOWN /RNCT 98 /RFF 6
5
        (RIGHT)USE THIS AS A DUMNY ENDING LINE [LEFT] [UP] [UP] 50"/RFF6""
6
7
        {RIGHT}/RNCH"{BS}"/XLENTER FIRST LINE HERE--->"H"
8
       /XQ
            THIS IS FOR INSERTING THE NECESSARY LINES
10 \A
        {DOWN} (DOWN) /WIR (DOWN) (LEFT) "(LEFT) {UP} {UP}
        /RNDB"/RNCB"" [DOWN] [DOWN] [DOWN] /RNDT"/RNCT"" [UP] [UP]
11
12
        /XNENTER LEVEL NUMBER (1/2/3/4) "F12"
       /XGB15
14
       /XNWRONG LEVEL. RE-ENTER NUMBER (1/2/3/4) F12"
15
       /XIF12<>1"/XGB28"
        /XI@INT(B)=@INT(T)~/XGB14~
        @INT((B+T)/2)~/RFF6
18
        {RIGHT}/RNDH~/RNCH~~/XLENTER LINE HERE --->~H~
19
       /XQ
       /XIF12<>2"/XGB27"
        /XI @INT (B*100) =@INT (T*100) "/XGB14"
22
        XI @INT (B) <>@INT (T) "/XGB24"
        @INT((@INT(B*100)+@INT(T*100))/2}/100~/RPF6~/XGB25~
        SINT ((SINT (B*188) + (SINT (B) *188+99))/2)/188"/RPF6"
24
25
        {RIGHT}{RIGHT}/RNDH"/RNCH""/XLENTER LINE HERE --->"H"{LEFT}
26
       /xo
27
       /XIF12<>3~/XGB34~
       /XI @INT (B*18888) =@INT (T*18888) ~/XGB14~
28
        /XI@INT (B*188) <>@INT (T*188) ~/XGB31
29
       PINT((EINT(B*18088)+(EINT(T*18088))/2)/18088*/RPF6**/XGB32**
@INT((EINT(B*18088)+(EINT(B*188)*188+99))/2)/18088*/RPF6**
38
31
32
        {RIGHT} {RIGHT} {RIGHT} /RNDH /RNCH /XLENTER LINE HERE ---> H {LEFT} {LEFT}
33
       /xo
34
       /XIF12<>4"/XGB14"
        /XI @INT (B*1888888) =@INT (T*1888888) "/XGB48"
36
       /XI@INT(B*18888) <>@INT(T*18888) ~/XGB38
        @INT((@INT(B*1888888)+@INT(T*1888888))/2)/1888888"/RPF6""/XGB39"
@INT((@INT(B*1888888)+(@INT(B*18888)*188+99))/2)/1888888"/RPF6""
38
39
        (RIGHT) (RIGHT) (RIGHT) (RIGHT)/RNDH-/RNCH--/XLENTER LINE HERE --->"H" (LEFT) (LEFT) (LEFT)
48
       /xo
41
42 LEVEL=> FIRST
                          SECOND
                                        THIRD
                                                      POURTH
43 CODE
            AA.888888
                          AA.BB8888
                                        AA.BBCC98
                                                     AA . BBCCDD
44
45
```

Figure 2: Macros that turn 1-2-3 into an outline processor.

Microsoft reports that new manuals are in the works and that the misprint will be corrected. However, I could get no promises that the printer section would be beefed up with more examples or better explanations.

#### 1-2-3 as an Outline Processor

In your May 14, 1985 issue (PC Magazine, Volume 4 Number 10), you published an article called "Processing Your Thoughts with 1-2-3." In it you included two macros designed to turn 1-2-3 into an

ros contained many errors and were impossible to use. I have fixed them up (see Figure 2) so they now work properly. Rolando Oliver

Repentigny, Quebec

The macro listing in the original article managed to omit all the tildes (1-2-3 carriage return symbols), so ves, they were impossible to use. We apologize.

For readers who don't have the original article, here are some brief instructions on how to use the outline processor. outline processor. Unfortunately, the mac- After you have typed in the macros, (1) put | propriately indented number. Type in the

cell A42 (the one that contains LEV-EL=>) in the top left-hand corner of the screen. (2) put the cursor in A45, and (3) establish titles with the /Worksheet Titles Horizontal command. This will keep the macros out of harm's way by making them

Start the outline processor by running the initialization macro. B4 . . B8. Now. when you want to add a line to your outline, run the second macro, B10 . . B40. It will prompt you for the level of indentation in your outline and will insert an ap-

inaccessible

LEVEL=> THIRD FOURTH CODE AA. 66864A AA. BB0000 AA.BBCC00 AA. BBCCDD 0.000000 USE THIS AS A DUMMY STARTING LINE 50.000000 INTRODUCTION 78.888888 MAIN SUBJECT

78.498668

First Example 70.494988 Elaboration on First Example

Second Example

bering scheme. An outline in progress

lines, the macro figures the new number by

taking the value midway between the two

existing lines. The macro builds double-

When you insert lines between existing

looks something like Figure 3.

78.748888 88.888888 CONCLUSION

Figure 3: A sample outline using the macros in Figure 2.

text of your outline item. The numbering scheme is hierarchical and works according to the codes listed in line 43. If you have established the worksheet titles properly, lines 42 to 44 will stay at the top of your worksheet to remind you of the numwant to rearrange the lines in your outline, change the numbers that the macro has assigned to them and use the /Data Sort command to reorder them Unlike the version that originally appeared in PC Magazine, this macro inserts each new line two lines below the cursor

spaced outlines only, so don't confuse it by trying to insert single-spaced lines. If you

rather than two lines above it. That's a more natural way of doing things.

Share Your Discoveries

Share your latest spreadsheet discovery through PC Magazine's Spreadsheet Clinic. We'll pay you \$50 for anything we print, plus an extra \$25 if you submit it on a disk. If you send a disk, please include a printout of your submission.

Mail your contributions to Spreadsheet Clinic, PC Magazine, One Park Avenue, New York, NY 10016-or send them to our electronic mailbox via MCI mail.

# Copies everyth



Personal Copier makes sure you're always up-to-date with the new and everchang ing protection methods. You want find an easier system. It's fully automatic, with easy-to-use two-step graphic screen every IBM PC use

should have one Order our Personal Copier today \$39 95 plus \$3.00 shipping and handling

# **\$6 Softwa**

\$12 \$12 of 610 \$12 1 year PC

Sel of 5 Language Disks \$30 \$15

by [] Check [] Visa [] MC

(408) 730-9291

600-235-6647 ICA O

CIRCLE 144 ON READER SERVICE CARD

# **PRINTERS**

Order Center Open 24 Hours **Every Day** 

#### 800-922-2812 **User-Friendly Prices**



FX-185 WITH NLO WIDE CARRIAGE

. 160 CPS . SELECTYPE . NLQ MODE . SK BUFFER

NEW!

 SELECTYPE™ • 160 TYPESTYLES · ONE YEAR WARRANTY

REPLACES FX100+1

\$474

**Ouantity** Pricina Available

Call..

Upon Request



DRAFT TO LETTER QUALITY

IN ONE AMAZING PRINTER

- · 200 CPS Draft Mode Over 200 Typestyles
- · Ultra-High Resolution
- Grephics . Four Times Faster than

the Average Daisy Whee at 67 CPS - Letter Quality

New Low Prices On Options

# EPSON-DX-10

DIABLO COMPATIBLE

DAISYWHEEL PRINTERS

Standard Epson Code

To Work With Most Popular Computers

EPSON-DX-20 • 20 CPS • 110 COLUMN ALL-PURPOSE INTERFACE

800-562-2 W HS-80 LETTERJET

FROM EPSON 160 CPS INK JET . PORTABLE or AC . STANDARD PAPER . NLQ . EPSON CODE

Price



PRINTERS Dlus Low Prices and Great Printers! EPSON - Panasonic - OKIDATA

Special Price ComRiter 266. CR-IIE ComRiter Special Price CR-420

Order Center Open 24 Hours A Day

1-800-922-2812

or in Missouri call: 1-314-227-4371 PRINTERS PLUS /910 Clayton Rd., #217, Ballwin, MO 63011

ING AND HANDLING AT ADDITIONAL COST, IMC AND VISA AT NO ADDITIONAL CHARGE) OFFER GOOD WHILE SUPPLY LASTS
PRICES ARE IN EFFECT UNTIL SEPTEMBER 30, 1985, SOME ITEMS MAY NOT RE AVAILABLE ON PUBLICATION DATE.

# Power User

Readers who wish to increase their productivity can use this forum to share their best hardware and applications software discoveries.

rules:

Judging by our mail loss of PC Magtive readers are house flaw with extine readers are house flaw with extine readers are proposed as a consultation of the private readers are as a voice discovering new and ingradulties. While most printer manulas now provide MSIC examples for sending out printer command sequences, our more creative readers are finding new alternative readers are finding new alternative We've seen some Pascel and assembler programs with printer control for features of DOS or existing applications without are additional programmines.

For those of you new to all of this, the object of the game is to control printer features (such as compressed, double-width, or emphasized print) with a minimum of house.

The earliest attempts of PC users to send control sequences to their printers used the COPY command. For instance.

COPY CON PRN

can be used to enter the control sequences directly from the keyboard.

This sechnique precludes typing an Escape code, however, since DOS interprets an Escape code by ignoring everything typed on the line and starting over again. Creating a 1-byte file called ESCAPE containing the Escape code (ASCII 027) helps somewhat when using the COPY command, for it could then be excuted as

COPY ESCAPE+CON PRN

Only the remainder of the control sequence after Escape would need to be typed in.

You can also create tiny files containing entire control sequences, with names like FORMFEED, COMPRESS, DOUBLE, and EMPHASIZ to turn features on, and COMPOFF, DOUBOFF, and EMPHOFF to turn features off. In this way.

all you would have to enter is COPY COMPRESS PRN

On a PC-XT hard disk, however, every file, no matter how small, takes up at least 4K bytes of storage space. Thus, these sevn files to give you a very simple printer control, would use up a total of 28K!

In this issue, we'll be looking at a number of differeni ways to control printers that solve some of the problems with the COPY command. But first, a few ground

I. The control sequences shown below are for the IBM Personal Computer Graphics Printer. If your printer is not compatible with the IBM Graphics, you must consult your printer manual for its equivalent control sequences.

2. I'll be using the notation (###) is a three-digit number. This notation means throughout his column, where ### is a three-digit number. This notation means: press the Alt be, type the three numbers on the number pod at the right of the key, to doesn't manter if NumLock is on or off, 100 and 190 the manter if NumLock is on or off, 100 and 190 the manter if NumLock is not off, 100 and 190 the NumLock is These keynestees generate the character for the three-digit of the NumLock is 128 or above, you'll probably see a foreign that the NumLock is 128 or above, you'll probably see a foreign that the NumLock is 128 or above, you'll probably see a foreign that the NumLock is 128 or above, you'll probably see a foreign that the NumLock is 128 or above to reserve the NumLock is 128 or above to reserve the February that the NumLock is 128 or above to reserve the February that Published the NumLock is 128 or above to reserve the February that Published the NumLock is 128 or above to reserve the February that Published the NumLock is 128 or above to reserve the Petrus.

3. Some control characters below 032, in particular the Escape (027) code, cannot be entered on the DOS command level. Fortunately, however, IBM, Epson, and compatible printers allow adding 128 to the control character. Most of our examples will take advantage of this feature.

When creating batch files with EDLIN, you can enter ASCII codes below 032 by typing a Ctrl-Vollowed by the appropriate capital letter or symbol. For instance, Ctrl-A (ASCII code 001) can be entered by

	\$2 NOVATION \$63! JUKI 53!	9 \$259
\$249 (1688) 000 \$259	\$1598 25979 \$239	\$258
PRINTERS	AST 6 PACK - W/SIDENICK	FARADISE
AXIOM DXXXXX DXXXXX 20x CITIZEN		- \$210·297
C. ITOH (feterror EPSON (All Model ENTER (Court II)	Epon Exacts;	\$259/379 358/369 . CALL LOW mp) \$459
JUKI 5310 180cps (color o 6100 18cps 6200 30cps 6300 40cps		\$336 334 545 639
LEGENO (Sqr Doi 880 1000 ps 1080 160 ps 1380 160 ps (1844) 1385 180 ps 15 (884		Reiri EPSON Comp.; 5179 196 249 210
SILVER REEO IL EXP500 EXP500 EXP770 Nicps TOSHIBA	0)	259 259 374 559 LOW
MODEMS « ANCHOR AUTO VOILS MODERN 12 (12) Express 1200 (HAYE	MONITOR	S . DRIVES
HAYES (1000, 1000	Ø)	249 CALL
NOVATION (HART STREETCH: 2000 IBM SHAPECH: 1200 WIN VENTEL Moderns TAXAN (122 4501)		229 CALL
400 RGB IBM HI RE 425 RGB IBM HI RE 440 RGB IBM ULTR PRINCETON GR	S witable	3119 375 389 513
COMPUTEI ATARI SOST. COMPAC IBM SYSTEMS (I NEC IAPC II). SOST PANASONIC 1976 ZENITH SYSTEM AST SIE PROC. SAK GENOA.	RS • CARD	S • CHIPS  CALL CALL LOW CALL GALL S200 \$150
FARA OISE Modular Graphics C 5-Pack		5245 149
SOFTWARI CAO Systems In-Michael Policed of CPA+ if or LOTUS ENABLE 1-2-3 SYMFONY MICROPRO MIC	grazers Flothers) 1-2-31 GL AP AR FI	TES  CALL  119 119 129 139
WordStar Profession WordStar 2000 WordStar 2000		1189 225 235 205
ORDER L	N. 20th Street # Phoenix. AZ 8505 INE 1-800-4 mation: (802)	DUSTRIES 10261 14 26-7979
	★ WE BUY IRPLUS GOC Cash Daccount Ships labelly sers check or man	DDS WS4

#### POWER USER

typing Ctrl-V followed by A. An Escape code (027) is entered by Ctrl-V followed by the left bracket (f). The ASCII code 000 can be entered by pressing Ctrl-V followed by @. or, more simply, by just pressing the F7 kev.

4. DOS 2.0 or above is required for all methods shown below that use redirection (>PRN) and for the batch file examples.

#### Verified Printer Set-Up

Until recently, I knew of no satisfactory way to send control codes to a printer. Going into BASIC and using LPRINT was slow and tedious. Here's an alternative method I discovered. If you want compressed print (ASCII code 015 or 143), for example, just issue the following command at the DOS prompt:

```
COPY {143} >PRN
```

DOS thinks that {143} is the name of a file. It won't find that file, so it writes the filename and the error message "File not found, 0 File(s) copied," But the redirection to PRN causes this filename and message to be printed on the printer. Because the "filename" is a control character, it switches the printer to compressed print. You can tell that the printer has been set to compressed print because the error message will be printed that way

John H. Biddle III St. Petersburg, Florida

Pretty clever, Mr. Biddle, even if you do have to waste a whole sheet of paper for the message, Still, I like the verification feature of this method.

#### Very Tiny Print

When printing out long program listings with a minimum amount of paper, I usually take advantage of an obscure feature of the IBM/Epson printers. This feature combines the compressed mode, subscript

```
echo off
if /%l==/ goto HELP
:CHECKMORE
if /%1==/ goto END
if /%2==/OFF goto TURNOFF
if %1==EMPH echo {155}E >prn
if %1==DOUB echo {155}W1 >prn
if %1==COMP echo {143} >prn
if %1==TINY echo {143}{155}s{001}{155}3{015} >prn
shift
goto CHECKMORE
TURNOFF
if %1==EMPH echo {155}F >prn
if %1 == DOUB echo {155}W# >prn
if %1==COMP echo {146} >prn
if %1==TINY echo {146}{155}T{155}3$ >prn
shift
shift
goto CHECKMORE
HELP
echo Parameters: EMPH (Emphasized), DOUB (Double-Width)
                   COMP (Compressed), TINY (Tiny Print).
```

echo To turn feature off, follow parameter with: OFF. Flaure 2. This PRINTER BAT file is used for sending control sequences to the printer. When typing this file with EDLIN, the notation \{###\} means you should type the three numbers with the Alt key depressed. The batch file con be customized and expanded for other printers and features.

mode, and a 15/216-inch line spacing (see Figure 1). To my mind, this is one of the smallest, yet clearest, typestyles available on any printer, allowing 14.4 lines per inch of clean, legible print. It's amazing how clear the structure of a program becomes-and how quickly it can be debugged-when it's printed on three pages

1 END

#### instead of seven. Charles D. Dines Santa Barbara, California

Yikes! It never occurred to me to use subscript for an entire document. This is tiny stuff, but I'm impressed-you can pack almost 160 lines per page.

Using John Biddle's verified printer set-up technique, here's how a printer is initialized for this miniature print:

This is normal default quality type printed on an Epson FX-85 in IBM-compatible mode.

Figure 1: Samples of regular and ultra-small print sizes.

COPY (143)(155)s(881)(155)3(615) 3000

I like it, and from now on I'll be submitting all my PC Magazine manuscripts printed with this feature. (Every writer is expend-

#### able, Charlie-Ed.)

**ECHO** to Printer I've seen EDLIN and DEBUG used to generate control sequences for printers, but a more convenient approach that's nearly as fast and a little less scary for many users is provided by the DOS ECHO command. For example, if you type the command

#### ECHO {155}W1 >PRN

you can change printing to double width on the IBM Graphics Printer.

Andrew B. Burns Stamford, Connecticut

Since ECHO is used mostly in batch files, we forget that it can serve a purpose by itself on the DOS command line. I like this technique. The only real problem is that ECHO also prints a carriage return and line feed, but I can live with that. Mr. Burns also included a printer control batch file, to which I've added a few features. PRINTER.BAT is shown in Figure 2, and you can expand and customize it as you see fit. You may want, for examile, to shorten the names of the parameters to

reduce pying time.
When PRINTER is entered with no parameters, it prints the short help message
shown at the end of the file. Entering a parameter by itself turns the feature on, and a
parameter followed by OFF turns it off.
Multiple parameters can also be entered.
The batch file command SHIFT is used to
retrieve and interpret each successive patered in the proper parameter of the successive patered in the proper parameter of the supertered in the property of the supertered in the property of the supertered in the property of the supertered in the super
tered i

PRINTER COMP OFF EMPH DOUB

Unfortunately, the IF statement is case
sensitive, so if you generally use lower

case on the DOS command level, type the keywords (EMPH, DOUB, OFF, etc.) in lower case in the batch file.

Strangely enough, the IBM Graphics

The IBM Graphics Printer does not have a "reset" control sequence that turns off all features and brings the print back to

default settings. But you can write a batch file to provide a software reset.

Printer does not have a "reset" control sequence that turns off all features and brings the print back to the default sertings. A printer reset has to be done through software. But you can write a

back file called RESET BAT that uses DEBUG on provide a software rest for the P.C. This is shown in Figure 3.1 know it doesn't took like abuck file, but its, Only the first line and last two lines are executed at batch file commands. RESET, BAT loads DEBUG with keyboard input redirected from RESET. BAT listed from twory about the error message when DEBUG BAT create a small program to rest primer, the "g" runs the program, and "g" terminants DEBUG.

You can also create a faster-acting RE-SET.COM file simply by replacing the "g" command with the following:

- n RESET.COM
- 9
- Then run the batch file to create the permanent command. You can delete RESET



CIRCLE 440 ON READER SERVICE CARD

#### ORDER TOLL FREE 24 HOURS EVERY DAY 800-662-2686

SPECIALS Rbase 5000 Open Systems Accounting (per module) State of the Art Bookkeeping System Citizen MSP 10 (60 cpr)...

279

Epson FX-185 Haves Smartmodern 1200B with Quadboard Expanded w/38/K. AST SixPakPlus w/384X verex 20MB Internal HD ashield 200 watt sock-up Power

Comersione w/Report With 149

Word Ver 20 Somoo B S/LAMOUAGE

CRN (35 cm)

Call Toll Free 24 hrs Every Day 800-662-2686 orders only Ca. Orders, Tech Support, Price Quotes, Info

415-668-935O 9-5 pacific time, m-f Call or Write for Free Catalog Was MosterCord Costner's Chacles Fersonol Chacles with 1 vis. alled F D in No text to credit cords. Co. restaints additional to US ground - Stype codes Service. The restaints additional to US ground - Stype codes Service. TREE for the orders over 195 bits. - 35 per order Service. TREE for the orders over 1900. Death Only 15 th acts.

THE BEST BEST PRICES SERVICE

SALCASTOCIST SHITE ART SAN EDANCISCO, CA GAILA a division of MCSS, Inc./Computer & Software specialists since 199 CIRCLE 107 ON READER SERVICE CARD

#### POWER USER

goto END mov dx. @ mov ah,1 int 17 int 28 (blank line ending with carriage return) ā END debug <reset.bat

Figure 3. This RESET BAT file can be used for resetting the first parallel printer. The batch file loads DEBUG, which then uses the batch file for keyboard input. This input creates and runs a small printer reset program.

BAT after RESET.COM has successfully been created.

SideKick Printer Control

I've been searching for a way to generate printer control sequences from within other application programs, and I've discovered a good solution using Borland International's SideKick program. I first created a notepad called PRINTER and turned on the graphics mode with the SideKick command Ctrl-QG. Then, a table was set up with some commonly used control sequences. Typing in the Alt sequences must be done quickly or the SideKick menu will pop up!

Now, I can call up the notepad from within most other applications, block off the appropriate control sequence with the SideKick block commands Ctrl-KB (or F7) and Ctrl-KK (or F8), and then do a Ctrl-KP, which prints the block. The control sequence is then sent to the printer.

Daniel Ehrmann

A somewhat modified and condensed version of Mr. Ehrmann's SideKick notepad is shown in Figure 4. ASCII codes of 128 and above can be entered with the Alt key and the number pad. ASCII codes below 032 are entered as Ctrl-key combinations. but they must be preceded by a Ctrl-P. The P'E in Figure 4 means type P and E with the Ctrl key held down. The SideKick notepad will show an E in reverse video. The ASCII code for Escape (027) can be entered directly in a SideKick notepad by typing "P" [ (a Ctrl-P followed by Ctrl-[ ).

Share Your Power

Tell the world about your latest technical tips for hardware and software applications through Power User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk

If you send a disk, include a printout of your submission to ensure against damage in transit. Mail your contributions to: Power User, PC Magazine, One Park Avenue, Chicago, Illinois New York, NY 10016.

	On	Off
Emphasized	{155}E	{155}F
Double Width	{155}W1	{155}wø
Compressed	{143}	{146}
Skip Perforation	{155}N^P^E	{155}0

Figure 4. A SideKick notepad that can be used to set printer functions. The appropriate control sequence is blocked off with Ctrl-KB and Ctrl-KK and then printed with Ctrl-KP.

# Publish the Most Important Book You'll Ever Own.

Names, Addresses, Phone numbers, All those little notes ... If you stop and think about it, they're probably your most valuable business tools. But if you're like most people, those little pieces of paper never seem to be quite where you need them. That's why we created "The Little Black Book" A practical little software package that takes all those names and numbers and puts them together. Then, prints them out quick. In little black book size.

#### 400 Entries. 30 Categories.

The Little Black Book holds up to 400 of your personal contacts. Create 30 different index categories (like sales offices friends customers. etc.). Call them whatever you want. Put up to 400 different entries in each index. Even all entries in multiple indexes. When you're finished, just tell us to print. A couple of quick keystrokes and bingo, out of your printer comes your little black book. On standard printer paper. Just cut along the dotted lines. staple together, and slip it into the leatherette cover that comes with the package. If you change a few numbers. or add a few addresses, print it again.

### The whole process only takes minutes. Pops in. Pops out. Even dials.

If all The Little Black Book did was print, it'd be a great value. But there's more. You're preparing a spreadsheet and you need to look up a phone number. Hit two keys and up pops your most frequently used entries. Tap the two-digit index code, and there's the number. If you have a Haves compatible modem, it's dialed automatically. Including access numbers for lower cost services like SPRINT. No Modem? Buy the Cygnet Accessory Dialer Board, or dial by hand. Either way, you've saved a little time. And probably a lot of money.

400 names, addresses, numbers and notes Inc.....(408)745-7000 eporation...(213/023-05) \*\*\*\*\*\*\*\*\*\*\* (617) 266-84; ..... (714) 641-850 meet Systems (4)51745-1344

Enc. .... (4191546-9310 me Associates

\*\*\*\*\* 19161966-2741 \*\*\*\*\*\* (223) \$67-8901

lac..... (818) 889-4030

poration. (303) 599-1500

Micetaons (415) 962-8811 20...... 16061222-0000

poration(408)985-6100

\*\*\* 1409) 734-4844

\*\*\*\*\* (415/644-1074

(4131891-9444

Use your Little Black Book to keep track of sales prospects; to print different books for the office, the home and the road. You can even buy one program and print books for everyone in your company (5 extra covers are only \$24.95).

There are thousands of reasons to buy The Little Black Book, but maybe one more might help. Try this. If for any reason you don't like the program, simply return it within 30 days. We'll return your money. No questions asked Call today: 1-800-621-4292 1-800-331-9113 (in California)

# The Little Black Book "

Prints entries in 30 categories that you create

Includes a handsome cover and materials for your PC to make multiple books



#### Bells, Whistles, And a Guarantee.

The Little Black Book also includes an Area Code Directory that pops in on demand (know the area, find the city and vice versa). And a "Screen Dialer" that actually finds

a telephone number in other programs and dials automatically. All this pops in and out of virtually every PC-DOS program available. Let Your

PC Make 'em. And Make 'em. Charge By Phone or Send In The Coupo

Pack of 6 extra covers for multiple books

onal Arresnory Dinler Board NEW LBB Printing Calculator +

The Little Black Book The Little Stark Book (not copy protected)

river \$5 stropping bandings Chrek

CYGNET

Handy Software for Busy People

Series.	Sand Property	Spend de las	\$49.9
Today.			PCM91
10.95	Name		
10.95	Address		
24.95			
19.95	City	Pink	To
19.95	Photo:		
	Outside TO add \$90 for a	shopping and handling. Surry, but a	a COD's or FOA.
Carl	1296 Lan	echnologies, Inc., Dept. grence Station Road le, CA 94089	LBB
-			

Absolutely No Questions Asked 30-DAY MONEY BACK GUARANTEE

# What the world really needs is a 99 cent **Double Sided, Double Density Diskette** with a LIFETIME WARRANTY!

# And DISK WORLD! has it.

Introducing Super Star Diskettes: the high quality diskette with the lowest price

### and the best LIFETIME WARRANTY!

In the course of selling more than a million diskeftes every month, we've learned something higher prices don't necessarily mean higher quality.
In fact, we ve found that a good diskette manufacturer is more framework to matter what they charge for it (By way of example, consider that near of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

in other words, when people buy a more ex diskette, they aren't necessarily buying higher quality.
The extra money might be going toward tlashier adver-tions, snazzier packaging or simply higher profits.
But the extra money in a higher price isn't buying better

quality
All of the good manufacturers put out a good diskette

#### How to cut diskette prices

...without cutting quality. Now this discovery pased a diferimal how to cut the price of diskettes without lowering the quality. There are about 85 companies claiming to be "diskette".

Trouble is, most of them aren't manufacturers Rather they are fabricators or marketers, taking other company's components, possibly doing one or more sleps of the processing themselves and pasting their labels on the finished product
The new Fastman Kodak diskettes for example are or

new earman record customers, for example, are one of these to are IBM 5% diskertes. Same for DYSAN, Polarcid and many, many other familiar diskerte brand names Each of these diskertes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices, without lowering the We would go out and find smaller companies to manu facture a diskette to our specifications specifications which are higher than most and simply create our own

same brand diskette.

Name brand diskettes that offered high quality at low DISKETTE STORAGE CASES

DISK CADDIES The original flip-up holder for

10 54" diskettes. Beige or Grey

\$1,65 ea. + .20 Shong. DISKETTE 70 STORAGE

diskettes Six dividers included An excellent value \$11.95 ea. +\$3.00 Shong.

Dust-free storage for 70 5%"

# DSDD

per Star diskettes are sold in multiples of 50 cmy. Diskettes an oped with white Typec sleeves, reinforced hubs, user 10 labels a write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes ere the same ones you've been using for yeers...without knowing it.

In our search for the low priced, high quality diskette of ocur dreams, we found something even more interesting.
We found that there are several manufacturers who'dn't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertis. ing trying to get you, the computer user, to use their

Instead, they concentrate their efforts on turning out the highest quality diskettes they can because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them and

sell them for much higher prices to you?

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette. software publishers who have the nasty habit of copy protecting their originals?

# Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of

Super Star Diskettes. You already know how good they ere. Now you can buy

Nowhere Super-Star diskettes have been around for years. . and you've used them for years as copy-protected software onguals, unprotected originals. Sometimes, depending on which computer you one, the system master may have been on a Super-Star disketter. And maybe more then once, you've bought a box or two or more of Super-Star disketter, which all knowing it They yet that discree "big" complety 5 and the star of the star of the original star disketter. name on them

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds.

We buy them in the millions And than we sell them to you.

Well, that's the story

#### When every little bit counts, it's Super Star Diskettes. You've used them a hundred times, under different

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy and call their own We simply charge less.

### Super Special!

Dider 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only \$8.75, shipping included. a lot fess than the suggested retail price of \$15.95



# The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against detects in original material and workmanship so long as owned by the original purchaser. Returns so song as owned by the drighter potentials. Resums are simple just send the defector diskettles with proof of purchase, postage paid by you with a short explain of the problem, and we'll send you the replacements (incidentally, coffee stained diskettles and diskettles with staples driven through them don't qualify as "defective".]

WE WILL MEET DR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND DUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.

#### HOW TO ORDER:

(In Minoia: 1-312-256-7140) INQUIRIES: 1-312-254-7140

FOR FASTEST SERVICE, USE NO COST MCI MAIL. Our address is DISKWORLD It's a FREE MCI MAIL, letter. No charge to you, (Situation permitting, we'll ship these orders in 24 hours or less.) ship these orders in 24 hours of less; )
swelfmes, 5 vs. 5 vs. 6 vs. 6 settlinES—Add \$100 per each
100 or heer deaches. STRER ITEMS Add shapping charges
as shown in address of heep orders accepted. 100 GR
VISA, MASTERCARD and Presad orders accepted. 100 GR
Red Commonal \$100 orders in anoling order and
FPO, AM, Mill & PM, GMREME, Include shapping Charges as
shown and adobted \$5 vs. files order shown for to their PM, ise listed above TAXES: Timos residents, add 8%

Human: BAM-6PM Central Time, Monday Ihrough Friday Answering Machine: 6PM-8AM, All Times MCI MAIL: 24 hours a day. SMES Tax NENTMUM ORDER: \$25 00 or 20 diskettes

Ð

SK WORLD!, Inc.

629 Green Bay Road Wilmette, Illinois 60091 ONE YEAR WARRANTY ON TOSHIBA ONLY AT ...

# **PRINTERLAND**

In Touch with Tomorrow

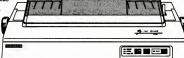
TOSHIBA P351

100 cps letter quality, 288 cps draft quality. 24wire print head

wire print h for superb correspondence and graphics quality. More printers at lower prices than anywhere else!

List Price \$1,695 Printerland price

1130



Choose from over 175 brands, 600 models. If it's currently being manufactured, it's available at PRINTERLAND. Dot matrix, letter quality, ink jet, laser and thermal printers and plotters.

Complete selection of printer accessories. Printer cables, ribbons, interfaces, paper, stands, even furniture. Everything you need to support your printer is available at PRINTERLAND at discount prices.

Complete service department. PRINTERLAND can service any printer, in or out of warranty, even if you didn't buy it from us. And we do it in our own shop, usually within 48 hours. Annual service contracts and "tuneups," too.

40

0

CALL Toll Free

P1340

144 cps draft speed, 54 cp correspondence speed 24-wire print head for enhanced letter and graphics quality. List price \$799 Printerland price 559

# FONT CARTRIDGES

Greek Math/APL Lis Elite Italic/ Gothic 15 Pri

Greek Math/Scientific-Pi Boidface/Letter Gothic

List Price \$79 95 Printerland price

terland price \$ 61 95

B00/255-9888

PRINTERLAND

The nation's largest Retail/Mail Order Printer Specialists

Prices subject to change without notice. WSA and Mester Card acceptable with a 5% service for PRINTERLAND's nine month depot service contract combined with the memicaturer's 80 day warrenty yields a ONE YEAR parts and labor warrenty. Printers must be returned to PRINTERLAND, fraight prapaid, for service under meintenence agreement.

# Sav-On Computers 800-34

DRDER DESK DNLY

# WE WILL BEAT ANY ADVERTISED PRICE ON THE SAME TERMS!

DISK DRIVES	DISK DRIVES	DISK DRIVES	DISK DRIVES	HARD DISKS
TEAC 5¼" DSDD	TANDON 100-2	JMR	IBM CONTROLLER	BERNOULLI
For PC & Compatibles	Full Height - 514" DSDD	Dual Thinline Cabinet	Handles 4 Drives	20 Mb Bernoulli Box
\$89.00	\$89.00	With Power	\$59.00	\$2795.00
55A 169.00 55F Cell	101-4 Call	\$89.00	Many More Cell	Hurry
HARD DISKS	IBM	IBM	IBM	IBM
Sav-On Computer 10 Mb Hard Disk	MEMORY	MEMORY	IBM XT	IBM PC
With Controller	64K \$6.99	128K \$12.00	\$1895.00	\$1549.00
\$499.00	Dealers Call	Dealers Call	Bare Bone	w/2 Drives & 256K
IBM	IBM	COMPUTERS	COMPUTERS	COPROCESSOR
IBM XT	IBM PC	COMPAQ	COMPAQ	INTEL
2 Drives, 256K,	2 Drives, 256K,	Desk Pro 2	Portable	8087-2
and 10 Mb Hard Disk	Sav-On Color Card and Amber Monitor	with Monitor	2 DSDD Drives & 256K	
\$2695.00	\$1699.00	\$2195	\$1875.00	\$94.00
COPROCESSOR	PRINTERS	PRINTERS	PRINTERS	PRINTERS
INTEL	OKIDATA	JUKI	JUKI	GEMINI
80287 for AT	192 (160cps) for IBM	6100 (18cps) Letter	6300 (40cps)	SG-10 \$219.00
\$239.00	\$369.00	\$369.00	\$679.00	SG-15 \$309.00 All STAR Printers Available
MODEMS	MODEMS	MODEMS	SOFTWARE	SOFTWARE
HAYES 1200B Internal w/S.W.	HAYES 2400 Smertmodem	ANCHOR Mark XII	LOTUS 1-2-3	SYMPHONY
\$345.00	\$679.00	\$215.00	\$289.00	\$399.00
All Hayes Available	Good Buyl	All Anchor Available	While They Last	While They Last
MONITORS	MONITORS	MONITORS	MONITORS	POWER SUPPLY
AMDEK	PRINCETON	PRINCETON	TAXAN	Power Supply
210A Monochrome	HX12	MAX-12	440 Hi-Res	135 Watt
\$159.00	\$439.00	\$199.00	\$509.00	\$109.00
KEYBOARD	EXPANSION CARD	EXPANSION CARD	EXPANSION CARD	EXPANSION CARD
KEYTRONICS	AST	AST I/O PLUS	DATA PLUS	TECHMAR
5151 Keyboard	6 Pak with 384K	Clock with Serial Port	256K Expansion Board	Graphics Master
\$189.00	\$279.00	\$129.00	\$169.00	\$449.00
		-		

Sav-On Computers, Inc.

port to change without notice. Not responsible for ical errors. CIRCLE 321 ON READER SERVICE CARD. **OPEN:** 7:30em til 6:00pm Mondey-Friday and 9:00em til 2:00pm Seturdey

#### EDITED BY PAUL SOMERSON



# User-to-User

PC readers use this forum to help one another by passing along their solutions, comments, and complaints.

#### Color Mastery

Several recent User-to-User submissions have explained how to set color attributes. but as soon as an application such as BA-SICA takes over, the attributes are disabled until the command is reissued. To prevent such a reset. I've written a program called COLOR.COM (see Figure 1) that intercents the ROM video INT 10H

Whenever the screen changes back to an attribute 7 (black background, white foreground), COLOR, COM will change the attributes to the desired one-and set the border color as well.

The program accepts two parametersforeground/background color and border color. The foreground/background colors can be found in the IBM PC Technical Reference in Appendix C and can be changed at any time. COLOR. COM saves itself into memory the first time you run it; later executions will update just the attributes. The part of the program that remains resident is just 83 bytes.

and enter

COLOR fg/bg br

where fg/bg is the foreground and background color (a decimal number from 0 to 255) and br is the border color (a decimal number from 0 to 15). Keying just one number will change the foreground/back-

Charlie Butrico

This trick really wins the gold medal. It lets you run otherwise initially drab gray-onblack programs such as BASICA or dBASE in full, glorious color, without slowing everything down. While I haven't tried it with every possible memory-resident program, it handles SideKick fine, and everything else I've thrown at it except such interrupt-hogs as TopView. Exiting some programs into DOS may temporarily return the dull screen, but typing in CLS

# To run COLOR.COM, get into DOS

ground color only.

South Plainfield, New Jersey

will immediately bring back your colors.

#### Program for creating COLOR.COM 110 CLS:PRINT "Checking DATA; please wait..."

120 FOR B=1 TO 25:FOR C=1 TO 1 140 READ AS: IF C<17 THEN 160

150 Z#=Z#+VAL(A\$)

160 NEXT:NEXT

178 IF 28=35864 THEN RESTORE: GOTO 200 180 PRINT "ERROR: CHECK THE LAST NUMBER IN"

198 PRINT "EACH DATA STATEMENT -- THEN REDO": END 200 FOR B=1 TO 25: FOR C=1 TO 16

220 READ AS:TTL=TTL+VAL("&H"+A\$) 230 NEXT

240 READ S:IF S=TTL THEN 270 250 PRINT "DATA ERROR IN LINE"; B\*10+330

268 PRINT "CHECK FIGURES AND REDO": END 270 TTL=0:NEXT:RESTORE

280 OPEN "COLOR.COM" AS #1 LEN=1:FIELD #1.1 AS DS

Floure 1: Pragram to create COLOR.COM attribute changer that eliminates drab gray-on-black screens.

# EXSYS

# **EXPERT** SYSTEM DEVELOPMENT

Creete knowledge based, probabilistic IF-THEN rule expert systems on an IBM PC, XT, AT or compatible

Provides the user with a list of possit solutions to e problem arranged in order of probability with probability factors Performs backward chaining and can explain how conclusions were read and why information is needed External programs, including most

spreed sheets end deta base managers, can be called with date passed into EXSYS for analysis and Exsys results accessible by other programs

ALL input is English text, algebraic expression or menu selection

Built in editor is MUCH faster and less prone to error than text editors and checks all new rules for consistency Numeric variables are supported end can be calculated and displayed by the expert system

Trig, log, exp and sqrt functions supported Full available memory is used and the

programs are written in C for fast. efficient code Full memory used, 700 rules per 64k of

memory over 192k (almost 5000 rules in a 640k PC) VERY FAST plus there is e utility to rearrange rules for maximum speed

Developed expert systems marketable WITHOUT ROYALTY Automated instruction on how to use the program

Requires IBM PC, XT, AT or compatible with DOS 2.0 or higher and 256k

DEMO DISK - Demo knowledge bases, text of menual, eutomated instruction on how to use the program and ability to create and run rules - \$10 (refundable with purchase)

FULL PROGRAM - \$295 + \$5 postage end handling

**EXSYS INC** P.O. BOX 75158 CONTR. STA. 14 ALBUQUERQUE, NM 87194 (505) 836-6676

# TOP OF THE LINE



# Trust Your Data

Used by thousands of firms for storag of critical data. Now available in handy 10-packs for your own vifol disk records

at low corporate prices. 57 87

Double Density Double Density Soft Sector Soft Sector

51/4" floogy diskettes in 10-packs, with Tyvek sieeves, hub reinforcing rings, user labels and write-protect tabs For IRM. Apple, Tondy, most popular computers

Premium quality disks, certified 100% error-free. Rigid monufacturing stondards and Quality Assurance controls make these DATA Disks "Top Of The Line

- Money-Back Satisfaction Guarante
- Lifetime Warranty Certified 100% Error-Free
- Meet or Exceed ANSI Standards

#### THE DATA DIFFERENCE

☐ FREE Shipping 48-Hour Delive

FREE Storage Cose The price you see is the price you pay-no extro charges, no small print Top quality certified disks at lowest prices, plus o free hard plastic librar

type storage case with each DATA 10-pack. Visa/MC, Cash COD's accepted





USER-TO-USER

```
29# FOR B=1 TO 25: FOR C=1 TO 16
318 READ A$: LSET D$=CHR$ (VAL ("&H"+A$))
328 PUT #1: NEXT: READ DUMMYS: NEXT: CLOSE
338 PRINT "COLOR COM CREATED"
348 DATA EB, 51,98,78,81,88,88,88,88,43,4F,4C,4F,52,88,FC,1347
359 DATA 88,74,1F,88,FC,86,74,2E,88,FC,87,74,29,88,FC,89,1627
368 DATA 75,8A,88,FB,87,75,85,2E,8A,1E,83,81,2E,FF,2E,85,1285
378 DATA 81,9C,2E,FF,1E,85,81,52,58,BA,D9,83,2E,A8,84,81,1273
380 DATA 24,0F,EE,58,5A,CF,80,FF,07,75,E6,2E,8A,3E,03,01,1661
390 DATA EB,DF,00,E8,6A,00,72,2D,E8,30,00,80,3E,87,02,01,1563
488 DATA 74,88,E8,D2,88,BA,52,81,CD,27,B4,35,B8,19,CD,21,1742
418 DATA 8B,P3,83,EE,8B,A8,83,81,26,88,84,46,A8,84,81,26,1377
448
      DATA
               #2,#1,9#,F3,A6,74,17,C6,#6,87,#2,##,9#,8C,#6,#7,1333
                81,89,1E,05,01,BA,0E,01,B0,10,B4,25,CD,21,67,C3,1224
ASE DATA
458 DATA BE,81,88,88,10,88,72,19,30,88,88,75,86,26,88,30,1128
478 DATA 8D,74,5B,A2,83,81,A8,84,81,E8,86,88,72,83,A2,84,1872
488 DATA 81,C3,26,88,3C,8D,74,36,26,88,3C,20,75,83,46,EB,1288
498 DATA F1,28,C8,26,86,3C,28,74,25,26,88,3C,8D,74,19,26,1311
588 DATA 88,3C,30,72,28,26,88,3C,39,77,1A,BP,8A,88,F7,E7,1489
518 DATA 26,8A,1C,61,83,8P,88,63,C3,72,8A,46,8B,D5,30,FF,1731
               88,77,82,F8,C3,BA,4F,82,B4,89,CD,21,F9,C3,BA,78,2888
82,B4,89,CD,21,F9,C3,B4,86,B8,88,B9,88,88,BA,58,1686
520 DATA
538 DATA
548 DATA 19,87,07,CD,18,84,02,8a,88,88,87,88,CD,18,C3,45,1472
558 DATA 6E,74,72,79,28,74,68,68,26,66,61,72,67,65,28,68,152
568 DATA 72,28,66,56,68,20,66,75,60,65,72,67,65,88,74,156
578 DATA 4E,68,28,61,72,67,75,6D,65,68,74,73,28,65,68,74,156
580 DATA 65,72,65,64,8D,8A,24,88,88,88,88,88,88,88,88,88,475
```

The shortcut to determining the foreground/background color (the first parameter) is to multiply the number of the background by 16 and add the number of the foreground. For instance, blue on white is 113 (7 \* 16 + 1). To set blue text on a white background with a cvan border.

type COLOR 113 3

#### AT Keyboard Tricks

170 NEXT

Little has been published about the marvelous AT keyboard, some of whose functions are programmable. Unfortunately, the AT Technical Reference manual is anything but clear on how to access the

programmable features For instance, it's simple to change the keyboard's LED shift-lock indicators. First issue an OUT &H60,&HED (the SET/RESET LEDS command), and follow this immediately with an OUT &H60,nn (where nn is a binary value indicating which LEDs to turn on). Bit 0 is for the ScrollLock indicator, bit 1 is for Num-Lock, and bit 2 is for CapsLock. The LED-CYCLE.BAS program in Figure 2 cycles the AT's LEDs through a binary counting sequence.

```
LEDCYCLE.BAS -- by Dan Rollins
110 DEF SEG=&HFFFF: IF PEEK(14)=252 THEN 130
120 PRINT "Try this on an AT only!": END
130 FOR J=0 TO 7
140 OUT &H60, &HED:OUT &H60,J
150 FOR DELAY=1 TO 1000:NEXT
```

160 IF INKEYS > "" THEN STOP 180 GOTO 130

Flaure 2: LEDCYCLE BAS program to cycle through AT LEDs in binary sequence.

# OUR STROKE OF GENIUS

Let our On-Line Reference series increase your productivity...

Just a keystroke away!



OLÉ" our new On-Line Encyclopedia series for IBM PC's and compatibles is organized by subjects and alphabetically by keywords ... for quick specific reference or indepth study. OLE uses pictures, animation, text, and understandable annotations to help you get up to speed quickly on any covered topic.

OLÉ is just a keystroke away because it sits co-resident in memory allowing you to access one or more of our encyclopedia series. OLÉs will increase your computer proficiency and enhance your productivity. Using OLÉ will be a stroke of genius on your part!

The first six volumes currently available are:

OLÉ DOS Makes all the complex DOS commands easy to understand and implement. Suggested retail price, only \$69.95.

OLÉ UNIX A clear, concise and unambiguous introduction to the UNIX multi-user operating system. Suggested retail price, only \$69.95. OLÉ Data Communications Clarifies complex concepts with more than 75 key terms presented. Suggested retail price, only \$69.95.

OLÉ BASIC An excellent guide for learning to program using BASIC. Quick on-line reference of key terms. Suggested retail price, only \$69.95.

is Vols. 1 & 2 Volume 1 is a keyword based tutorial! of fundamental terms. Volume 2 provides an easy intro to databases, spreadsheets, word processors, accounting and graphics. Suggested retail price, each volume, only \$39.95.

**OLÉ Computer Literacy** 

Requirements: IBM Color Graphic

To order call toll free

1.800.GET.OLÉS

CIRCLE 200 ON READER SERVICE CARD



However, turning an LED on or off does not change the ScrollLock, Num-Lock, or CapsLock keyboard shift states. These actual shift states are controlled by hits 4. 5. and 6 of the BIOS KR FLAG at address 0040:0017. To illustrate this, I wrote the TOGGLE, BAS program in Figure 3, which turns on the NumLock LED and sets the NumLock state.

But the most significant new feature of the AT keyboard is that its typematic action is programmable. You can specify the amount of time to wait before sending the first repeat (the delay) and the time be-

tween repeats (the rate). First, output a command (&HF3), then output a delay-and-rate value. Bits 5 and 6 control the delay, ranging from 250 ms up

to 1 second. The lowest 5 bits (bits 0 through 4) identify the repeat rate, ranging from about 30 repeats per second to 2 repeats per second. The following two commands set the keyboard to perform at my favorite pace-1/4-second delay and 20 repeats per second:

OUT &H60, &HF3: OUT &H60, 4 Important-be sure to enter both com-

mands on the same line. After receiving the &HF3 command, the keyboard locks up until it receives the rate and delay data byte.

You can use the KEYRATE BAS program in Figure 4 to set the keyboard typematic parameters. It includes the logic to display the exact delay and rate you select, calculated with formulas from the AT Technical Reference Manual.

The default power-on settings are a 1/2second delay and a repeat rate of 10 per second. A better choice of settings is a 1/4-

100 ' TOGGLE.BAS -- by Dan Rollins 110 DEF SEG=&HFFFF: IF PEEK (14) = 252 THEN 130 120 PRINT "Try this on an AT only!": END 130 NUM.LED=4:NUM.FLG=&H10 140 CPS.LED=2:CPS.FLG=&H20 150 SCR.LED=1:SCR.FLG=&H40 160 DEF SEG=&H40 170 POKE &H17, PEEK (&H17) OR NUM. FLG

180 OUT &H60. &HED: OUT &H60. NUM. LED Flaure 3: TOGGLE.BAS program to set AT NumLock state and turn on LED.

#### FREE

Order our catalog that's on disk for \$7.00. There's a program for every computer user. SAVE TIME and let the computer search for the topic for you on our Catalog PERSONAL:

Federal Income Tax, Wills, Home Budget - Financial. Date Book, Improve Reading TECHNICAL.

Unprotect Software, Compress Basic, Che Assembly Tutor, Pascal, Forth

General Ledger, Setup Dot Matrix Printer, Setup Letter Quality Printer, Mail List, Bar Graphs, Print Spooler

CAMPS Chess, Star Trek, PacMan, Rubic's Cube, Worm Eat-em Apple, Fro Kaleidescope, Modify for Flight Simulator

PECIALITY Ham Radio, Real Time Simulation of B747 Flight, Kermit

(\$1) We have a special puckage with 5 disks that include: communication, spreadsheet models, games, music, sorted directory, etc. + FREE CATALOG.

\*110 - UTILITY Check System Out: Check System out plus boards that

n. er: Changing cursor ape & size

ad: New &

5) COMSPEC=: Allows correct operation of COMSPEC= in UBLIC DOMAIN SW

80 Olcott St. B 130 nta Clara; CA 95054

\*111 Cover: Allows directory listing that goes in disk cover (very nice)

that goes in disk cover (very nice)

2) After file attributes: Hid & protect your files

3) Purge: allows casy selective deleting of files

4) Patches: (variety) ches: (variety)

ograms on a Hard disk NO COD'S OR PO'S

For Traceable Shipments: UPS \$5, per 10 disks - U.S. Mail \$10, per 10 disks Canada & Overseas: Add \$10. Shipping, Calif. Res. add 7% tax. 621-0854 ext. 215

968-0130 CIRCLE 527 ON READER SERVICE CARD

# No More Boxes Stored ALL OVER THE ROOM

#### No More Heavy Boxes TO MOVE EACH TIME YOU CHANGE PAPER

This cabinet is designed to reduce bulk paper handling as well as save time and energy for busi-nesses who use many different types of forms. We have combined a versatile storage cabinet with a sliding printer table top so that all forms will be aligned, no matter where they are stored. This cabinet is capable of handling many different forms in different widths. For more information, call or write:

Compu\*cab

P.O. Box 5800 • Va. Beach, VA 23455 • (804) 481-4332

second delay and 15 to 20 repeats per sec- | to your throughput. ond. It is possible to set the keyboard to output up to 30 repeats per second. After a little practice, you will find this setting is

Dan Rollins La Crescenta, California

perfectly manageable and a definite boon | The ability to change the typematic rate

100 ' KEYRATE. BAS -- by Dan Rollins 110 DEF SEG=&HFFFF: IF PEEK (14) = 252 THEN 130 120 PRINT "Try this on an AT only!": END 130 PRINT "=low values are fastest=" 140 INPUT "initial delay (0-3): ", ID 150 INPUT "repeat rate (0-31): 160 OUT &H60, &HF3:OUT &H60, (ID\*32) OR RR 170 PRINT "initial delay is"; 180 PRINT (ID+1) \* . 25; "seconds" 190 A=(RR AND 7):B=(RR AND 24)\8 200 P= (8+A) \* (2°B) \* .00417 210 PRINT "repeat rate is":

Figure 4: KEYRATE BAS program to set AT keyboard typematic rate and delay.

220 PRINT 1/P; "per second"

and delay is indeed welcome. After working with a normal, sluggish cursor, it's a pleasure to run KEYRATE and watch the cursor scamper across the screen. The AT keyboard is IBM's best yet, and this trick makes it even better.

#### Free Graphics Keyboard

It's always been difficult to use IBM's high-bit graphics set-the little border pieces, math and foreign-language characters, and odd symbols with ASCII values greater than 127. Normally, you have to look up the ASCII value of each high-bit character, hold down the Alt key, type in the three-digit ASCII code, and then release the Alt key.

However, DOS 3.x includes five programs on the main DOS disk that you can adapt to create a totally customized keyboard. The KEYBxx.COM programs let you

turn your IBM/American keyboard into

#### SOFTWARE DEVELOPERS

#### Save thousands of dollars! Save hundreds of hours! by using our assembly language sub-systems

FABS

**B-TREE SUB-ROUTINES** Internationally known and used in many best setting application

internationally known and used in many best selling application programs . . . Rapid access and maintenance of large files with lixed-length records . . . Versions available for CP/M-80, CP/M-86, MP/MII, MS DOS, PC DOS, Microsoft BASIC(s), COBASIC, CBASIC 68, LATTICE C. RETAILS FOR \$150 DEALER/DEM PRICES AVAILABLE

FARS PLUS

Expanded version of our FABS products... Up to millions of records OEP on Key Size... Extremely last on unlimited number of keys... Re-indexing program included... Can be used on Ilies as large as your system can hold. RETAILS FOR \$195 DEALER/OEM PRICES AVAILABLE

#### SORT/MERGE SUB-ROUTINES

AUTOSORT

Optimized for very large files; stand-alone or caliable sub-routine, extremely last..., Versions available for CP/M 80, CP/M 86, MP/Mill, MS DOS, PC DOS running Microsoft BASIC(s), FORTRAN, PASCAL, CBASIC, CBASIC 86, CBBI. CB 86, LATTICE 20. RETAILS FOR \$150 DEALER/OEM PRICES AVAILABLE

#### DATA, SCREEN, REPORT MANAGER

DR-FARS

A highly capable (MTA ASES package designed to perform for everyone from the novice user in the Stand-duce mode to the protestical programmer in the fluor Time mode. Consider files, forms, proport, handless creating. B-Tree Indexing, high speed scriting capabilities. Rush-Time mode use with BASIC INTERPRETER/COMPILER. For MS DOS, PC DOS on 18th PC/TI, GCE Rainabow, Victori 9000, Sarry, Fujitsu, etc.

RETAILS FOR \$295 DEALER/DEM PRICES AVAILABLE

#### For more detailed information concerning any of our products, please contact us: COMPUTER CONTROL SYSTEMS, INC Route 3, Box 168, Lake City, FL 32055 (904) 752-0912

# **DISK WORLD!** is proud to introduce the lowest-priced, LIFETIME-WARRANTY diskettes ever!

And they're BRAND NAME PRODUCT to boot!

 $5.25'' \text{ SSDD} \rightarrow .79 \text{ ea. } 5.25''$ 5.25" DSDD-HD→\$2.35 ea.

3.50" SSDD→\$2.25 ea. 3.50" DSDD→\$2.65 ea.

bash Pinnacie Series Dis Two years ago, if you'd told me I'd be writing this ad, I would Just saying that quality control was poor would be So much was wrong that DISK WORLD wouldn't sell them.

That was yesterday Kearney-National Inc., a \$202-million division of a much right company, came into Wabash. Dut went the old imanagement, the old methods, the old reduction techniques... and in went a lot of new people, ideas, eduction lines and some really imaginative thinking.

The end result. Today, I'm proud to offer you the Wabash Pinnacle Series diskettes at the prices shown. This isn't evolution in diskette manufacturing it's revolution. ud to offer you the Wabash Pirmacle Series of

Here's what you get. pash Pinnacle diskettes are certified 100% Error Free are coverd by a LIFETIME WARRANTY meet or exceed all industry specifications (by guite

and are simply the best value in diskettes available

The torture test Considering Wabash's earlier dibbous reputation, I wasn't exactly a true believer when their Director of Marketing came into my office with samples. So I book a box at random, selected a disk, bent the thing serve which way and sliggest it mon my IBM-PC. It formatted it booked it stored and retrieved data.

Thet wasn't enough

I neet wearn't enough.

I gove samples of the distincts of Duril Rossenbuch and, in turn, to lear Street. both hackers of long experience and manipulation of the property of the Washess Group.

Tom neally weet at it.

He took a quart-halopen lamp, armed it at the disketts until it started to smoke (and mett), and then formatted, boated the diskettle and stored under returned start.

The street turnity (and intensionally multilated diskettle ran on all II). Course and IIII.

rt was ricer.
I simply bent the diskette every which way...and it still afted, booted and ran on his Apple. The bast buy I've ever see

The best buy I've ever seen.

DISK WORLD, his selfs mere heabs magnetic media by
L is President of the comparison, and the
L is President of the corporation, word tolerate a product
with a failure self of more than 1 (1000 tol 1 persent
I also den't life compones who by to mits a "quest" or
I also den't life compones who by to mits a "quest" or
I also den't life compones who by to mits a "quest" or
I also den't life plan ingine prior the bytan and Verbildm
As President of DISK WORLD, the, my mobils is emple. "The
best distants for the least amount of motey."

Webssh is it. Right now, there is no better value than the Wabash Pinnacle

Series of diskettes
Granted, you have to buy a hundred at a time, but so what?
Split the order with friends, relatives, co-workers or even your

Tha key thing is to get the most disketta for the money. And this is if

**DISK WORLD!, Inc.** 



th is. Our first order for Wabash Pannacia Diskutton was 5-million units.)
That's are awful lot of faith and confidence.
But, than again, I have the disketta that Yom Street interally effed...and legst on running.

The truth about \$1.00 or less disksttes. ere and more eds ara popping up offering diskettes for

More and more eds are purposed we \$1.00 or less. By the same taken, more and more people who were selling sell cars a few months ago are now selling diskinets by mail. We did a little survey of current add for diskinets advertised or a dotal or less and did storm earlyss of the market and hard what we fought as it popules to 3.20 '0500' diskinets "and share when the properties of 3.20 '0500' diskinets "and proposedly" selling for a dotal or this "services."

VENDOR:	ADVERTISED LOW PRICE:	PRICE PER 100	
Lindech	89 ca.		Unspecified
Datatech	99 ea	99 es.	Unspecified
Computer Club	95 ea.	96 ea	Linspecified
	99 40	102 41	Unspecified
Communications			011001111111
& Electronics	49 ea.	50 ez.	Linsteched
Precision Data	89 ea	93 **	Unspecified
Diskette Cornec	93 ea.		Unspecified
Comp Soft Serv	77 ea.		Unspecified
Oline on con-		+ shoo	
Computer/Compute	r 99 ea.	99 48.	Unspecified
DISK WORLD	89 ea.	92 ea.	Wabash Datetech

I not real truth about 3 - Low or less diseastres. It costs all diseaster manufacturers about the same to produce a diseaste. Some may charge more because they wont to project a "premum quality" mange, als the bits, lamented Dysan who bought their basic media from 3M. Soma Charge less because they self a sub-standard product. and we're not froit this enough to manne names here. But here's the fruit about the 31 four less desirable names.

The DISK WDRLD's of the un

hey can buy first quality product in massive quantities ar se to pass on the savings to you. (Precision Data ar title Connection on BRAND NAME products also tall in

The people who buy "cosmos". stuff from major manufacturers that usually first quality control standards, but is cosmetically blemished and thus can't be packaged and sold

connectably blumshed and that can't be packaged and sold water the manufacture's own mans.

3 "Duplicater Gustley" lincertified media, usually below manufacturer's continuodes and incomety brown MOI and manufacturer's continuodes and incomety brown MOI and sighthat the manufacturer's name will ensert be divisignd (seasily about a 20% recept rate, as command to DSSW MOI standard of less than 1/1000h of 1% resect/returnate Next to 30438 or less 3 the accord in road districts solventines at all dollar or less 3.

objete or ins.

2 on good her row of Groots, he could be come to the country of t

The Critical Factor

Only DISK WORLDI, Inc. offers fully brand-identified, LIFETIME-WARRANTY product for less than a dollar. E-Yery one else offering 5 25° product for less than a buck doesn't fell you who makes if We do And that ought to tell you a lot right there

# Ordering & Shipping Instructions

SHIPPING: Webash Pinniacie Diskettes are sold in mal-tiples of 100 only. Shipping charges are \$3.00 per 100, regardless of type or size. PAYMENT: VISA, MASTERCARD and PREPAID orders rniment: visa, Mastericanu and PREPAID order optied. Corporations rated 3A2 or better and govern stit and quasi-government open accounts are accepte a NET 15 basis.

on a MET IS base.

C.D.D. codes are about to a SSO to record harding or a MET IS base.

C.D.D. codes are about to a SSO to record harding on a MET IS base.

C.D.D. codes are about to a SSO to record harding of the state of the

Not responsible for typographical errors

ORDERS ONLY: 1-800-621-6827 (In Illinois: 1-312-256-7140)

INQUIRIES & INFORMATION 1-312-256-7140 FOR FASTEST SERVICE.

USE MCI MAIL: Just address "DISK WORLD" (24-hour shipping on any item in st if you order via MCI MAIL.)

> 629 Green Bay Road Wilmette, Illinois 60091

#### USER-TO-USER

one more-suitable for use in the UK. Germany, France, Italy, or Spain by switching some of the letters and punctuation marks around and substituting things like pound signs for dollar signs.

To create a custom keyboard, copy one of these five programs onto a work disk. and give it a name like KEYCUST.COM. Then oo into DEBUG and make the changes. Search through the file until you see the familiar "asdf . . . " and "ASDF . . . " characters at the right side of your screen, and then replace the exist-

ing letters with the ones you want. For instance, to customize the KEY-BUK.COM so that hitting the leftmost nine keys-"gwe" on one line, then "asd" on

the second line, and then "zxc" on the third line-produces a box, type COPY A: KEYBUK, COM B: KEYCUST, COM

and then DEBUG KEYCUST.COM

When you see the DEBUG - prompt.

- e 592 da c2 bf e 5af c3 c5 b4
- e 5ae cØ cl d9

(hitting the Enter key at the end of each line). Then load the new keyboard program by typing KEYCUST.

You can toggle back and forth between your normal keyboard and the customized one. Hit Ctrl-Alt-F1 for your normal keyboard, or Ctrl-Alt-F2 for your new one. By following these procedures, you can create all sorts of alternate keyboard layouts-one with graphics symbols, one with math symbols, etc., and load them whenever you need them.

-Paul Somerson

#### Share Your Discoveries

Tell the world about your latest discovery through User-to-User, and we'll pay you \$50 for your trouble, plus an extra \$25 if you submit it on a disk.

If you send a disk, please include a printout to ensure against damage in transit. Mail your contributions to: User-to-User, PC Magazine, One Park Avenue, New York, NY 10016.

# COPY II PC™

#### BACKS UP PROTECTED SOFTWARE

The backup insurance you need to protect your software investment. COPY II PC makes a floopy backup of most\* protected software quickly and easily.

#### RUNS PROTECTED SOFTWARE FROM YOUR HARD DISK

COPY II PC makes using your hard disk as convenient as it should be. No longer will you have to keep your floppy disk in drive A with some of the most popular business software - call for current list.

Minimum Requirements: IBM PC, XT, AT, 256K ir and some compatibles. One or two disk drives. 64K on most machines.

Call M-F 8-5:30 (W. Coast time) with your 3 3 : 503/244-5782. Or send a check (add \$3 s/h, \$8 overseas) to



\$39.95

ENTRAL POINT Software, Inc. 9700 SW Capitol Hwy. \*100 Portland OR 97219

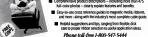
We unclate Cour. If PC regularly to handle new protections, you as a registered owner may modate at any time for 1/2 price! (To update, just send original disk and \$20.)

This product is provided for the purpose of enabling son to make an hir of copies only

# CIRCLE 152 ON READER SERVICE CARD

Free Cata Your 80-page guide to computer supplies and

accessories-including complete new broduct descriptions. Packed with over 1600 products for microcomputers, minicomputers. and word processors - many available nowhere else. pecial section devoted to new supplies and accessories. prehensive product descriptions - including more than 475



CIRCLE 227 ON READER SERVICE CARD

Usar	an organ
.04	Con ful
The state of the state of	
100	■ Fa
	■ B
4	
FREDY.	
, Co.	
The same of the sa	

COMPANY

•	Phone toll-free 1-800-547-5444	or send coupon toda

inmac Inmac Catalon Dent 2465 Augustine Drive Santa Clara CA 95054

Year	rush	myh	ee cop
he in	тас С	atalog	fund
dand	there	sno	dspilo

CITY			
STATE	ZP	PHONE	

# PC BlueBook

#### ■ ADVERTISING RATES AND INFORMATION:

Standard listings consist of a bold lead line (23 characters maximum): 7 lines of body copy (45 characters per line); 4 lines for company name, address and telephone number, \$200 per insertion—4 issue minimum. Additional charge for extra lines and company logos. Prepayment and frequency discounts available. American Express, MasterCard. Visa accepted. Copy subject to publishers approval. Send typewritten or printed copy, reproducible logo art (if applicable) and remittance to Kathryn Cumberlander, Classified Sales Manager, Ziff-Davis Publishing Company, One Park Avenue, New York, NY 10016. For additional information, assistance, or to place an order by phone, call collect (212) 503-5115.

SHEET FEEDERS GALOREI

popular printers (these and others):

July 6100 and Anadry 6000 6500

GRAY DAVIS, INC.

(602) 274-1596

or work-alike TJ SOFTWARE INC

Arlington Heights, IL 60006 (312) 364-1065

STRIPE READERS

PO Box 2044

purchase

TPS Electronics 4047 Transport Stre Palo Alto, CA 94303

(415) 856-6833

77 E. Weldon, Suite 210

Phoenix, Arizona 85012

BAR CODING

AR CODE/LABEL PRINTING

THE LABEL MAKER" prints bar codes, OCR-A.

like and large characters from data entered all

keyboard or from disk files. Create and save

unique printing formats and record layouts. Per-

forms record add, change, delete, sort and se-

lect on desk files. All LABELMAKER" prints AIAG

shipping/parts identification labels required by

Auto Manufacturers Programs require IBM PC

BAR CODE READERS/MAGNETIC

TPS provides Bar Code and Magnetic Stripe

Readers and combinations of these for simple

installation on IBM PC, AT, and 3180 terminals:

DEC Rainbow, Pholessional, and VT 200 series

terminals, NCR DecisionMate V and PC N, TI Professional, AT&T/Olivetti, Wang PC and VS 4200; Apple Macintosh, Northstar Dimension

Bar code label printing program \$50 w/header

Reliable, easy to use Zivad sheet feeders for m

Daisy writer 2000, Dataproducts 55, Toshiba

1351, Quine Sprint 7-11, Nec 3500, 2000 & 8000

series TEC F-10, Ricah 1300 & 1600 ..... \$495

MO personal, cashier's check, free shipping.

#### ACCESSORIES

# FURNITURE

**IBM COMPUTER COVERS** Our computer covers are made of touch, durable, water resistant 1 9 ounce rip slop nylon. Our product protects your corrouder system from dirt and dust Satisfaction guaranteed. IBM PC cover \$18.99, IBM PC AT cover \$24.95, Call for pncing of any other computer cover MC, VISA, AMEX. INSTRUM

ASL COMPUTER DIVISION Order lof free USA 800-826-6559 800-251-0400 800-221-4621

# ACCESSORIES

SUPPLIES

DYSAN DISKETTES 5%\* Double Sided Double Density (104/20) \$2790 Each 2-9 Boxes \$26 90 Each 10-19 Boxes \$25 90 Each 20-49 Boxes \$24 90 Fach FREE Shipping & Handling-Large Accounts



316 N Owen Street Mount Prespect. IL 60056 (312) 392-2621

### BUSINESS OPPORTUNITIES

#### GRAPHICS DEALERS NEEDEDI Nations largest stocking distributor of Mitsubishi high resolution color graphics display mon-

lers/VARs appressively selling the CAE, CADD, CAM markets. Competlive pricing structure and quantity incentives to qualified accounts. Call for complete information:

Intec, Data Systems Divesion 23132 La Cadena Latura Hills, CA 92003 714-859-3800

START YOUR OWN DEM BUSINESS With our IBM PC/XT Compatible System FOR ONLY \$695 (complete system) 256KB RAM, Two 360KB Sanyo Floopy Drives Monochrome Graphic & Printer Port Adapter High quality de-tachable keyboard Color Montor (Thomson) \$330 RGB Color Graphics Card \$85. GMG Computer Services Pte. Ltd. 106 Robinson Road

#08-01, GMG Builds BEDLIBLIC UE CINCADORE Tel: 2259111 Th: RS22068 GMGCS

#### MONEY MAKER FOR CONSULTANTS

Law time management is the key to your share of \$5 billion and specialized software-handware sales projected by 1990, LTM time and billing software for large and small professional firms has received a published national save review Use if for your own billion and sell if to afterner's, CPRs, and all others who bill for their time. Dealer discounts on every sale LTM is consistently chosen over heavily advertised products some costing 10 times its \$495 price. Send for

MEGAMETA, Inc. 8990 Libyd Place Los Angeles, California 90069 213-279-5249

#### COMPUTER/ INSURANCE

### If your computer is important to you, insure it?

SAFEWARE provides full replacement of hardware media and purchased software. As little as \$39 a year covers fire, liheft, power surges, carthquake, water damage and auto accident. Call 8 am to 8 pm Monday thru Friday Saturday 9 am to 5 on SAFFWARE THE INSURANCE AGENCY INC 2929 N High Street Columbus, OH 43202 (614) 262-0559 (DH), (800) 848-3469 (NAT)

#### COMPUTER/ LEASING

## PC•XT•CDMPAQ•Apple Rental Quick delivery within U.S. All configurations in-

cluding new AT moderns & printers. Attractive rates & flexible terms. Lease 1 month or longer. Custom leases to fit budget requirements. A portion of your lease paym chase. Trade old PC's on new AT. Purchase/Inase.

USE'R COMPUTERS, INC. 12800 Industrial Park Blvd Minneapolis, MN 55441 (800) 624-2480 (National) (612) 559-7096 (Minneapolis) (214) 783-8999 (Dallas)

#### COMPUTER REPAIRS

#### IBM PC/XT/PPC & COMPAG PORTABLE REPAIR Circuit boards and electro

professionally required on ATE (Automatic Test Equipment). An alternate solution, with lower propriet and fast turnsmund. Dealer & Maintainer packages available. From keyboard to nower supplies. Call UNITRACE INCORPORATED 2185 Del Franco SI. San Jose, CA 95131-1575

#### COMPUTER SERVICES

MOR) 946, 1000

#### SDETWARE LOCATORS

Find the right software to meet your needs. Save your valuable time while making an informed decision. Call us with all of your requirements. and get our Custom LOCATOR report of only those programs that are right for you. All appli-cable product literature automatically sent. Re-lail store plans also available. The LOCATOR costs only \$1995! Software Locators, Inc. 1905 E. 17th St , Suite 317

Santa Ana, CA, 92701 (800) 824-7240 (800) 257-3800 in CA

#### DISKETTE COPY SERVICE

#### ALLENBACK INDUSTRIES, INC.

Allenbach created the industry, and we've since been imitalted—but never duplicated. Copies supplied on OEM quality Allenbach LIFETIME GLARANTEE diskettes, now available in a vari-ety of colors. Virtually all formats and systems. Copy protection, serialization, downloading and iging available. Rapid delivery on 100 to 1,000,000 cocies



ALLENBACH INDUSTRIES INC 5957 Landau Court Caristad, CA 92006 (800) 854-1515, IN CA. (800) 468-2627

#### BLANKET ORDER SERVICES

DLAME! OF SERVICES SCHOOL BLANKE! OF SERVICES SE printing or applicabl STAR-BYTE, INC.

2564 Industry Lane Notistown Pt. 19401 (215) 539-4300 (800) 243-1515

#### DECADE OF SERVICE 31/4 + 51/4 + 8 Guaranteed fast turnaround for duplication and formating on high quality OEM diskettes. Vir halfy all formats: Commodorn Annie IBM PC Kaypro, DEC, Atari, plus many more. Serializa-

tion, state of the art copy protection and custom nackaning available. Personalized service is our SPICENTY. COMPLITER MEDIA PRODUCTS 5482 Complex St., Suite 110 San Diego, CA 92123 (619) 565-7802.

#### 9 TRACK TAPES to IBM-PC

Convert mailing lists or other main frame data on 1600 BP1 9-track tapes to PC-DOS 514 diskettes. New automated process guarantees data verification. Easy instructions for loading to your data base (dbill, RB4000, etc.) or hard disk. Only \$60 per million chars. \$95 minimum. Renne box \$30/M

1259 El Carnino, Suite 260 Mento Park, CA 94025 (415) 323-6338

#### HARDWARF

#### ADD-ON BOARDS **IEEE-488 INTERFACE**

Halfsim IEEE-488 interface and software turns your PC, AT or compatible into an instrumentation work station for the lab, test, and mean ment. We are the major OEM supplier with interfaces for 10 different architectures and the most comprehensive coverage of operating systoms and languages \$365 software \$75. NATIONAL INSTRUMENT 12109 Technology Blvd. Dept PC Austin. Texas 78727

(800) 531-5066 or (512) 250-9119

### \$200 PER MEGABYTE Memory expension for your IBM PC, XT or AT at \$200 per megabyle. All the memory you've dreamed of at a price you can live with, JRAM-2 and JRAM-AT hold up to 2 megabytes per board with Ser/Par/Ciks also available. Mega-



TALL TREE CYCTCLIC 1120 San Antonio Road Palo Alto, CA 94303 (415) 964-1990

# FIXEO OISK BIOS/BOOT

FIXT boots from most popular Hard Disks-DA-VONG, XEBEC, KOMEGA, GT LAKES, etc. Adds XT-like BIOS interface to your disk for PC. Security, multiple volumes, removable media sup-port optional. No-stot plug-in installation. Specify nitroller and corrigular with order \$80-\$180 Add \$3 shop, CA tax



GOLDEN BOW SYSTEMS PO. BOX 3039 SAN DIEGO, CA 92103 619/298-9349

VIDEOTAPE GRAPHICS/TEXT PC-VideoGraph is a single-slot board that in-stalls in IBM PC, XT, or AT. Runs all std. software such as Lotus 1-2-3 and Microsoft Flight Simstator Dual outputs for display on IBM monitor and for videotaping Price: \$695. Optional graphics overlay on video: \$1,295.



NEW MEDIA GRAPHICS CORPORATION 279 Cambridge St. Burlington, MA 01803 617-272-8844

#### HARDWARE

### COOLING DEVICES

SILENCE AND COOL YOUR PC Does your PC sound like a high speed turbine? Does it use expansion cards that create extra heat? Solve your noise and cooling problems with the SILENCER from PC Cooling Systems. The

super quiet SILENCER operates with 94% less noise than the standard fan it replaces & yet provides double the airflow for your vital IC's. The SILENCER mounts to existing holes on the back of the IBM PC, XT or clone and is guaranteed for the life of your PC \$79.95 + \$3 shipping (CA res add 6%) Visa/MC/check PC Cooling Systems

31510 Via Ararat Dr Borsali, Ca 92003 (619) 723,9513

#### HARDWARE

#### COMMUNICATIONS DATA ANALYZER FOR \$1195

Both a serial data monitor and protocol significafor this board and software has extensive simulation programming capabilities. Handles SDLC. BSC, and ASYNC. Now, you can buy both a computer and a protocol analyzer for less than the price of competitive analyzers. For trial unit

PROTOCOL CHANGERS 1055 SANTA ROSA COSTA MESA, CA 92626 714-546-5068

#### HARDWARE DISK DRIVES

### 1.2M8 PC-AT DISK DRIVES

AT your PC by replacing your diskelfs controller and adding a high-density disk drive. LDKSKETTE handles 1 to 4 diskette drives plus an I/O mod-ule \$249 for JDSXFTTE-SA \$250 for Tear 55GF (1.2MB), \$200 for Teac 55B (360-IQ, \$180 for Ser/ Par iCity module TALL TREE SYSTEMS 1032 Elwell Court, Suite 124

### Palo Alto, CA 94303 (415) 964-1980 HARDWARE

# STORAGE DEVICES

5644 Kearny Mesa Rd San Diego, CA 92111 (819) 571-5555

**COUPLER FOR 9 TRACK TAPE** Two models available to read and write 1/2 in magnetic tape with formatted 9 track drives. Runs all speeds and densities in PC XT and AT ninring MS-DOS or XEMIX. Data transfers up to 904,000 bytes per second! Complete with cable and software, prices start at \$880. OVERLAND DATA, INC.

HARDWARE PERIPHERALS

PCIT ADD-ON ORIVES Upgrade your PCir with our user-installed add on drive system. If includes a replacement disk controller (operates up to 3 drives), a 2 drive cable, external 360K drive(s) & software for oper-ating the extra drives. Provinciate IDOS 21 \$296. (ane drive), \$449 (2 drives), \$149 (controller only).





#### Albuquerque, NM 87123 (505) 292-4182

\$6 shipping

#### HARDWARE POWER

#### PROTECTION MEIRICK STAND-BY POWER THE MERICK STAND-RY POWER SYSTEM

provides back-up power and protection from power failures, brownouts, surges, spikes, and power line noise. The enclosed battery will supply a long run time during a power failure 240 watt system-\$365, 400 watt system-\$495; 3972-mateur thew 008 MERICK Inc. POWER SYSTEMS DIVISION

Box 298 Frisco, CO 80443 (303) 668-3251

### MAILINGLISTS

#### **WAILING LISTS**

Now over 855,000 micro owners. Select by brand 219M Apple, 179M IBM PC, 156M TRS-80, 97M Commodore and more! 9 phone verified reseller lists including 6,211 stores , WA's chain buying offices, Canadian and more! 25,000 Unix users. 14,000 computer companies. Lists by software brand, piniter model, modern owners, investors, educational, etc. Over 75 different micro and min lists Call or write for FREE catalog. Include phone and type of business you're in.

TARGETED MARKETING INC

Box 5125 Ridgewood NJ 07451 (201) 445-7196

### SECURITY PC-POWERLOCK

Prevent unauthorized use of PC's, copying ma-chines, other office machines with PC POWER-LOCK. Also useful at home to control power tools. TV's, radios, stereos, anything electrical. Sale and security for \$12.95 postpaid, two for \$25. No installation requained, your satisfaction

guaranteed! PC-POWERLOCK 393 M-89 Planwell, MI 49080

#### TAPE TO DISK CONVERSION

TAPE TO DISK CONVERSION

Convert any 9 track magnetic tape to or from over 200 formats including 3%", 5%", 8" disk formats and word processors. Formats available include IBM-PC, APPLE, Altos, TRS808' CP/M. Displayer, IBM SYS/77, Macintosh, Wang, LA-NEIR, OS/6 and 300 more Disk to disk conversions also avail. Call for more info. PIVAR COMPUTING SERVICES, INC.

47 W Dundee Rd. Wheeling, lifinos 60090 (312) 459-8010

SOFTWARE

# ACCOUNTING

CUSTOM PAYROLL All systems support multiple pay categories, calculation of all taxes, user-defined deduc-

tors, exceptional item handling, a variety of necessary reports, paychecks and W-2 forms. Written in PC Basic with full source included for easy maintenance Prices start at \$895.00 for basic system and manual. DATASMITH INC.

Box 8036 Shawnee Mission, KS 66206 Phone (913) 381-9118

PC-FUND is a fund accounting system for local govts, schools, colleges, and not-for-prolit groups. The system includes: General Ledger, Report Writer, PO/Encumbrance, payables, recovables, payroll/personnel, budgeting, utility billing and fixed assets. The system supports up to 99 funds, 9999 departments and up to 36 liscal periods are on line. PC-RUND runs on the BM-PC and most MS-DOS & XENIX computers. AMERICAN FUNDWARE, INC P.O. Box 773028

Steamboat Springs, Colorado 80477 (303) 879-5770

CONSTRUCTION ACCOUNTING CMAS system is designed specifically for commercial contractors where tracking ob costs is required. Eve modules available are into costno. Pavroli, A/R, A/P, and general ledger. Interactive modules run stand alone or in any combination. Contact Jeff Kilb.

Data-Basics Inc. 11000 Codar Road #110 Cleveland, OH 44106 (216) 721-3400

IRCHITECTS AND ENGINEERS AEMAS System is designed specifically for ar-chitects, civil engineers & other professional firms where monitoring project costs is required. Modules available are job costing, payroll, A.R., A/P, general ledger & automatic invoicing. Interactive modules stand alone or run in any combination. Contact 86 Fraedrich.

DATA RAKEINS INC. 11000 Cadar Rd. #110 Cleveland, OH 44106 (216) 721-3400

**CPA REVIEW** BM PC takes the work out of preparing for the exam. AICPA questions with referenced solutions are random generated by exam weights. Study single, multiple or all categories with or without solutions. Scores, creates results table & updates data base for future study. Sold by

PO Box 6512 Huntsville, TX 77340

1,49001241-9700 in W VA (800) 642-2677

MicroMash ....

A "true FIFO" perpetual inventory system with multiple databases, usage graphics and vendor pop-up windows. Custom developed by a bank to manage its forms inventory inventory vendor and transaction history databases with query/ select/archive functions. Past transacti meeting search criteria may be selected in reports. Automatic graphics display of the usage of each item by month. 10 sort options, Tutorial.

UNION NATIONAL BANK/ HOOSPHERE SOFTWARE COMPANY PO 8m 1541 Little Rock, AR 72203 (501) 378-4000 est, 4288

OPEN SYSTEMS, INC.

BUSINESS & ACCOUNTING SOFTWARE-bad becoming #1 with 60,000 businesses installed. Superior products plus superior service. · Accounts Payable · Accounts Rec · Fixed Assets . General Ledger . Human Resource Mgmt. . Materials Mgt. . Payrol . Purchase Order . Sales Order . Report Writer OPEN SYSTEMS, INC.

6477 City West Play Eden Prairie, MN 55344 1-(800) 328-2276

ACCOUNTING SOLUTIONS

For CPNs and growing businesses software for both, with optional link between the two. For CPRs: Client Ledger System, the leading write-up program for PCs. Reporting, possive payou, more. For small business: Total Accounting System. 12 integrated accounting prog-hult-in DRAIS networkship.



TCS Software, Inc. 6100 Hillcroft, Suite 600 Houston, TX 77081

800-231-6454 or (Texas) 800-392-5973 G/L ACCOUNTING POWER

forwide support

Now, the same financial reporting power used by offices of all of the "Big 8" is available to cor-porate controllers. AMI's DATAWRITE (TM) Corporata General Ledger gives complete flexibility for custom reports. Fixed Asset Management and The Tax Machine (TM) are available too. No-



3633 136th Place SE ne WA 9800 (800) 425-8201, (200) 643-2050

THE BUSINESS ACCOUNTANT® Financial management for the consultant, entrepreneur or small business. Cash or accruzi method. Save bookkeeping costs. Features: De-partmental accounting • Balance Sheet • P&L



on Support Software, Inc. 1300 Vincent Place-Dept. B McLean, Virginia 22101 (800) 368-2022 (703) 442-7900

#### \$50 ACCOUNTING PACKAGES

 General Ledger 
 Payrol 
 inventory 
 Accounts Receivable 
 Accounts Payable 
 Order Entry/Invoicing . Purchase Orders. These are professional, proven packages! Requires PC/MS-DOS 21 + 29K RAM. Price includes MANUAL Telephone support available • Accountants Client Writeup Package-\$150. Above prices are prepaid, shipping included. We accept cash, check or money orders. MCRS 12703 Shatner-Airline #202 Houston, TX 77014

(713) 563-6628

SOFTWARE

BAR CODE

BARCODE SYMBOL GENERATION Print bar code w/text on IBM PC/XT/AT/Compatibles using PC/MSDOS, Support for DKI 84, 92, 93, 2410, Epson FX, Fujitsu DPL24, IBM thics, HP Laser & Toshiba P351 Prints Code 39, 93, 2 of 5, 12 of 5, Codabar, UPCA & OCR on label stock. Keyboard or file driver. Inc./dec. numbers. LDGMARS, AIAG and HIBC. DATAFLOW TECHNOLOGIES, INC.

8422 Bellona Lane, Suite 303 rson, MO 21204 (301) 296-2630 / 686-2366 SOFTWARE

RUSINESS

TIME ACCOUNTING & BILLING TABS is designed for use by professionals who bill on the basis of time (attorneys, accountants, etc.) User-friendly data entry and menu-driven program selection makes TABS easy to understand and operate. STI's full-feature software in currently in use by over 1400 firms nation



SOFTWARE TECHNOLOGY, INC. 520 No. 48th, Suite 120 Lincoln, NE 66504 (402) 466-199

dBASE II/III SOFTWARE GENERAL LEDGER (integrates w MOICERI dINVOICER (Bitting & A/R) \$99 SALES ANALYSIS (Morks with dINVOICER) \$99 JOB COSTING (for Contractors)

JOR ESTIMATING (Works with Job Costion SOURCE CODE included for dBASE It or 11. Require priviter, 2 360k Floppys or Hard Disk. dATAMAR SYSTEMS—(619) 584-2727 3550 Carrino Del Rio North—Suite 208 San Diego, CA 92108

Marchy Card-Visa-Check-COO

HardRusser\*
Run Lotus without system diskettel This is the authentic HardRunne\* program that allows you to run Lotus and Symphony from your hard disk. without the need for a system floopy in the Autrin, \$34.95 plus \$5 s&h, For further information saa advartisar index listing for Nostradamus. NOSTRADAMUS 5320 South 900 East Salt Lake City, UT 84121 (901) 261-0769

#### PROFESSIONAL TIME/BILLING Handles 400 clients, 20 partners, 80 job (&40 cut of pocket expense) descriptions, 20 area of practice codes, fixed fee or per hour brilings, & more Prints billings, monthly statements, aged

receivables, & more. Free lelephone support \$149 (VISA, M/C, AMEX) Other griginal soitware Call/White for FREE CATALOG! MICROLARY PROCRAMMEDO 173 Brich Avenue NUCOS, CA 934317

(805) 995-2329 (24 hour)

INFORMATION PLEASE (\*) A comprehensive financial records keeping and billing system for your business. Many report-

ing and printing features, including wild card searching Fast, flexible, easy to use and inexpensive business tool, supported fully \$69.95 with documentation and source code, \$19.95 without, (add \$2.50, s/h)

PO Box 27463 Minneapolis, MN 55427

MILPSS-MIXED INTEGER LP A GENERAL-PURPOSE system for solving it

integer linear programs with up to 45 integers 255 constraints and 1255 variables. Solves problems by applying the branch and bound method. Menu-driven with many useful fea-tures similar to LP88. Requires 192K, \$99 with 8087 support, user's guide VISA/MC. EASTERN SOFTWARE PRODUCTS INC.

Alexandra, VA 22309

#### (703) 549-5469 LP88-LINEAR PROGRAMMING

A powerful menu-driven system for solving lin ear programs with up to 255 constraints and clude interactive and batch operation spreadsheet-style input and editing, a storage system for problems and bases, sequental file input/output, Simplex algorithm restart, a complete report generator, sensitivity analysis. Regures 192X \$99 with 8087 support, user's quide VISAIMC

EASTERN SOFTWARE PRODUCTS, INC. Alexandria, VA 22309

MYTE MYKE" BUSINESS SYSTEM Commercial grade, integrated business appli-cation software. Order Entry, Inventory Control, Sales Analysis. Accounts Receivable, Accounts Payable General Ledger, Purchase Orders Pro-



M&O SYSTEMS, INC 2005 N. Ruddoln Rel PO Box 108 (716) 662-6611

PC CALENDAR BY CCI Time management system. Menu driven with hein command. Schedule agets on daily calendar in half hour segments. Schedule a day, week or month at a time. Repetitive agets , automatically scheduled. You never need to rewrite the text of message. View any date or see calendar for any year. Send \$50 check or M.O.

PO BOX 273

#### REMINDER (follow-up system) Professionals and managers, insure that no important commitment or action date will be overlooked. Map of future work flow for yourself. and staff

. REMINDER prints out your daily to-do list. What you didn't do today carnes over into tomorrow's list Repetitive to-dos are automatically rescheduled. You never have to rewrite the text of

. Enter items in up to 30 custom categories and as far ahead as 1999. Call up messages one day. at a time or in chunks of time. No limit on mimber of entres Toll-free number answers user questions. Runs.

on all IBM PCs or compatibles. Price \$99-30-day money back guarantee



CAMPBELL SERVICES, INC. 21700 Northwestern Hwy . Suite 1070 Southfield, MI 48175 (313) 559-5955 Toll-free (800) 521,9314

# SOFTWARE

BUSINESS PROJECT MANAGEMENT

# AHA! (40B) 458-9119

found if The number to call for software to manage any complex project, e.p. R & O. CON-STRUCTION, BUSINESS/VENTURE PLAN-NING! Demo Sampler-Pack includes PMS-II RMS-I, MMS-PII HARVARO TOTAL PROJECT MANAGER, HORNET, PERT-MASTER, TIME-LINE, SORCIM SUPER PROJECT PLUSIOU staff of Project Managers and Microcomputer professionals provide NEEOS ASSESSMENT, SET-UP, TRAINING INDIVIDUAL CONSULTA-TION by arrangement!



AHALING PO Box 8405 Santa Cruz, CA 95061-8405 (408) 458-9119 oject Management SERVICES

#### PRIMAVERA PROJECT PLANNER"

the most project management you can get from a micro. Plan and schedule networks of up to 10,000 activities. Level resource use. Control schedule resources and cost. Call or write to find out why Prymavera is used by managers worldwide for improved project performance Primavera Systems, Inc.

Bala Cyrrwyd, PA 19004 (215) 667-8600 Telex (910) 997-0487

MICROPERT® 0 Project scheduling for IBM PC, XT, AT & true compatibles DOS 20-30 Time-scaled Network Degrams and Gent charts to merochrome display, color monstor or printer. Flexible calendar Extensive manual with samples Easy to use Demo available Call or write for brochure Price \$250 00 (Demo \$25.00) SHEPPARO SOFTWARE COMPANY 4750 Clough Creek Road Redding California 96002 1915) 222-1553

#### SOFTWARE

# COMMUNICATIONS TELEX LINK SOFTWARE

your computer to telex service via ITT. RCA or WU with Cawiflon's telex software Designed specifically for telex communications. Cawthon software is easy to use, has on-line help, self-test diagnostics, frequently called numbers, and an excellent User's Guide. Cawifion software is available for many computers and operating systems



learborn, Michigan 48124 Phone (313) 565-4000

#### COMPUTER BULLETIN BOARDS Join the googlar world of PC communications with one of our easy to operate com-

puterzed message systems complete with IDEA-TREE multiple tanic \$139 00 . PC-OATE matchmaking \$99.00 Customized and other systems are available. On-line demo at (206) 932-7125. VISA/ MC PROTOSOFT

PO 80X 16756 Seattle, WA 98116 206-932-5310

#### FREE EASYLINK SOFTWARE

Electronic mail, Telex, Marigram, F-Com via through us and get the best EasyLink soft-ware, INSTANTCOM trop (\$195 value). Menu driven. Fast messaging via lext editor and directories. Supports unattended operation.

and more 15110 S.W. Bonnes Ferry Boad (800) 228-6176 (503) 635-8572

FAST, SMART FILE TRANSFER Want to transfer fries between PC's with

the expense of a network? FASTWIRE and a senal cable can send your bles error-free much taster and easier than using lingows. Send tiles at 115 2K baud in seconds, or a full XT (10 mm) in less than 30 minutes \$50 quantity discounts. Ask about XENIX PARAGON COMPUTER CONSULTANTS 3877 North 200 East (801) 266-3794

# SOFTWARE

ENTRY

#### DATA ENTRY SYSTEM Heads down data entry for the PC will allow fact

and accurate preparation of data files for your mainframe Features Auto dup, verlication, auto format change, table lookups, range checks, batch totals, dup key, record insert and much more Ask us about our free 30 day trial period COMPUTER KEYES 8519 193 SW Lynwood, WA 98036

/206) 776-6443

Combines flexibility and performance in an interactive Easy-To-Use environment Features Search, Append, Insert, Multiple Formats, Update, Data Print, Custom screen painting Edits Must enter, Auto Dup, 029 keyboard, constant, Check Digit, MUCH MCRE! Transfer Nes to PC/ DOS, with Record Audit, Menu Driven, HELP tacrity Volume Discounts Price \$350.00 Demo Surus Systems

4244 Ridge Lea Rd Ste 25 Amherst, N Y 14226

### RDDE/PC DATA ENTRY SYSTEM

RODE/PC is unmatched for power & ease-of-use Menu-driven, pop-up help, heads-down speed. extensive incut validation, automatic reformat ing, conditional processing, operator stats, 029 keyboard option, much more \$40 demo \$595 for first license, \$395 each additional. Volume

20823 Stevens Creek Blvd., C1-C Oupertino, CA 95014 (408) 973-9292 TELEX 701111

S1DES/PC

Replace your 029, 129, 3741/3742, 5280. etc. Virsions: Extended keypunch to comprehensive, full function for high volume, heavy editing Features include standard keypunch + verify table lookup,search, insert/delete, format chain, select, balance, statistics & much more. Prices start at \$196-30 day hee trial. Software Consulting Service, Inc. 8930 Fourwinds Drive, Suite 231 San Antonio, TX 79239 (512) 656-6484

ENTRYPOINT

Most widely installed data entry system for PC/ XT/AT. Heads-down speed, sophisticated multiscreen applications. Features, paint the screen form design, data validation, table & file lookups, Help keys, logic processing, reformatting. batch totals, verification, 129 KB remapping & more Demo \$24, Operator \$545, Developer \$845 Volume priging

DATALEY ASS Sth Street San Francisco, CA 94107 (415) 541-0780, (800) 962-8888

SOFTWARE

DATA CONVERSION

DON'T REKEY-CONVERTI We use the latest disk, lape, & tele tions technology to reformat data for you QUICKLY AND ACCURATELY, USUALLY AT ONE TENTH YOUR CURRENT COST, We transfer data

between word processors, typesetters, micros mann, marriagnes, & software packages. We supply a full range of consulting services including Data Customization and Database Data Conversion Laboratory 67-27 168th Street

SOFTWARE DATA

Fresh Meadows, N.Y. 11365

718-939-4921

MANAGEMENT

PC-FILE III" nw for 1985, version 3.0, is faster than ever. Enhancements 32767 record capacity, field size up to 1665 bytes, instant "snapshot" mailing izbels, much more. Exchange data with 1-2-3, WORD, WordStar, etc. Over 100,000 copies of PC-File in use, Printed manual \$49 check, M/C or VICA Tot tree 24 hour order line. 1-800-JBUTTON BUTTONWARE PO Box 5786 Bellevus, WA 98006

GENERAL MULTIKEY SEARCH Fast search on a file of objects with any o of search keys. User enters USTS OF KEY WIL-UES. Objects matching a list are its LIST SET. Program EVALUATES the UNION or INTERSEC-TION of ANY NUMBER of LISTS SETS, or their

COMPLEMENTS. File structure: two yar width fields, CODE and KEYVALUE, dBASE III, 392 Central Park West, Apt. 12X

New York NY 10125 (212) 222-5050 CDMP from SubRDea COMPILED DATA BASE

MANAGEMENT LANGUAGE Removes diBase It's limitations: 6 data files • relational = 50 + new and enhanced commands. functions . local, global, matrix variables . procedures. Consists with dibase II programs. FAST! 8087 support. Free product description of COMP \$195. Developers (no ticense lee) \$395. Add \$8 S.H. Demo \$25. Tutorial Manual \$29. Sub Rosa Inc.

1650 Inlester Blvd. Winnings MA R2X 2W4 Carada (204) 632-7475, 885-8543

**NEW! PC-DESK II BETTER!** A new desk management program with more features than SideKick, Poly Windows, and Spotlight-combined Memory resident! Fea tures Calendar/Reminder, Word Processor, Mail Merge, Database, Auto-Dial, Calculator, Prints Group letters, Memos, Phone Directory, Rolodex Cards, Labels, Ervelopes. Background operation Manual on disk \$49 + \$2 shipping Software Studies, Inc.

8516 Sugarbush Annandale, Virginia 22003 (703) 978-3524

RREAK DUT of the dBASE/Interpreted Lanquage barriers with "C ENGLISH". Use English anguage/dBASE-like syntax to produce appli cations that Run 20-100 times faster than dBASE: Are portable to Major UNIX systems; Are fully Multi-User under UNIC Convert easily from ISE applications \$795 00 MATAMAR SYSTEMS-(619) 584-2727 3550 Carnino Del Rio North-Suite 206

San Diego, CA 92108 Master Card-Visa-Check-COO SOFTWARE

EDUCATIONAL.

THE FUTURE IS NOW MOTHER GOOSE-Now gener ary software for young children. Brillant color graphics, animation and lively music. Instills computer & reading skills & is child proof. Electronic page turning allows your child to expe ence the wonders of Mother Goose It's fun, IBM PC/XT & PCyr, Tandy 1000 (256K), \$34.95 \$2.50 S/H VISA/MC SUNSTAR SYSTEMS

Route #4, Box 368 Oodensburg, NY 13669 (315) 393-7117

**GRADE WEEK VACATIONI** 

Average and print out your grades in minutes with the last, easy to use Aeius Gradebook. . 16 classes of 64 assignments, 46 students . Finds makeup grades at touch of a single key Prints grade sheet, averages, student grades PCDOS 2 X 128K. Send for free Herature. Order \$47.50 + 2.00 Handling (2.85 tax Cal.) Anna Corporation

90 By 700457 San Jose, CA 96170-0457 SOFTWARE

DEVELOPMENT TOOLS

DEVELOPMENT SDLUTIONS Lise your PC as a complete developm tern. Cross-assemblers target most popular chip

families. Debug with AVSIM full-screen soft were simulators and TRICE in-circuit emulators Turn your code into firmware with superfast AVPROM EPROM programmers Available for CP/M-80, CP/M-86, PCDOS/MSDOS host systems. Priced from \$200. Call for details

AVOCET SYSTEMS INC

Aurorat Systems Inc. P.D. Box 490-G ckport, ME 04856 (801) 448-8500 (207) 236-9055

SOFTWARE FDIT

A professional text editor ideal for program deoment and all text editing tasks. Edit many files at once, take directories, resame, create and delete files from within the editor, test search and replace, context senselve help, can replace ac-cidentally deleted text, flexible keystroke macro's and much more. Small, tast, powerful, and easy to use. For PC's and compatibles needs DOS 2.0 or later, 128K \$99 VISA/MC COLLEGE SOFTWARE 911 Clark Avenue Arres, lowa 50010

515-233-4023 SOFTWARE

ENGINEERING **NEW STRUCTURAL DESIGN** 

Fast, efficient, versable structural analysis and program in spreadsheet format—BEAMS. COLUMNS and FRAMES of any material Friendly next and output with data storage and COLDR graphics Specify PC, XT or AT and send \$25 for demonstration disks C-Squared B-Squared Software Design Inc. 763 27th Ave. San Francisco, CA 94121 (415) 751-1337, (900) 621-0651

smARTWDRK®

Printed-prout artwork editor for double-sided boards up to 10" by 16", runs on an IBM-PC, Color display allows complete interactive control over the placement and routing process. 2X artwork can be made on a dof-matrix printer or pen-and ink plotter \$895. Write or call for a brochure

WINTER

WINTEK Corporation 1801 South Street Latavette IN 47904-2993 (317) 742-8428

**ENG/SCI GRAPHICS** MNPLOT(S) (screen graphics) & DMNPLOT (P) (pictier driver) provide integrated engin ing/scientific 2-D & 3-D graphics with NO PRO-GRAMMING REQUIRED! Menu-driven, florible professional Choice of formats: tabular/line

contour, bar, pie, 3-D wire frame & much more! OMNIPLOT(S) \$195, OMNIPLOT(P) \$195. Buth MICROCOMPATIBLES

301 Prelude Drive Silver Spring, MD 20901 (301) 563-0563

SIMILI ATION

CREATE PCB's FASHY Easily create double-sided printed circuit board

rk of up to 21" square using PC-layout on an IBM-PC. The artwork is created using a color artwork editor. The final artwork, solder mask and sile-screen/leddis-moduced using either a print or a plotter Price \$745 Demo Disk/Manual \$95 DRACD TECHNOLOGY 7210 Jordan Ave., Suite D50

Canoga Park, CA, 91303 (800) 235-6645 ext. 646 (outside CA) (800) 235-6647 ext. 646 (CA only)

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. More than just a language, it is a simulation en-vironment specifically designed for interactive use on today's high-speed microprocessors. Using GPSS/PC, you can predict effects of changes to real-world systems MINUTEMAN SOFTWARE PD Box 171/B Stow, MA 01775 1-(800) 343-0864 ext. 4800 (U.S.) 1-(800) 322-1236 ext. 4800 (Mass. only)

SOFTWARE

ENTERTAINMENT substitution, Choose from 5 calegories with 500

CRYPTOPUZZLES For word nursie enthusiastsi Solvina givo grams on a computer lets you have all the fun while the computer takes care of repetitive letter

quotations in all Plus, an infinite number of word arithmetic problems based on 200 phrases. \$22 + MA 5% tax VISA/MC/CHK SOFTSTART PD BOX 803 FRAMHICHAM MAC1701

(617) 620-8315

(206) 746-4296

#### STAR FLEET I

"I call STAR FLEET I the world's most elaborate star battles game" - Jeny Pournelle, Byte Sept. 84 Features full color, music, promotions, Canture ships, lay mines, launch probes, rescue bases, repair damage, eliminate intrusters, more 98 pg manual Reg. 128K, PC/PC/r., 1 dmer, 80 cols. \$49.95 + \$2 s/h. Also for Ti PC, SANYO

MR 555 (192K) For CC reders PO 80x 57825 (800) 622-4070 Webster, TX 77598 (800) 942-7317

(713) 486-4163 (in litross)

ICON: QUEST FOR THE RING Electronic Literature-Unique Graphics-Real Time Action. ICON alone lets your IBM PC display 16 colors at 320 × 200 with standard color card. An adventure based on Wagner's operation eac "The Ring" Monsters, dwarves, Rhine

maidens, drappes, an authentic pict and more All in 16 colors/ Visa/MC/C00/Chic \$49.95 Marmoom inc 151 Soth St., N W Suite 127

Atlanta CA 30313 1-800-622-8086 or 404-874-6448 in Ca

CRINSTAR 85~ Beat your books or office pool with world's most soohisticated NFL analysis package. Verifiable 10-w back record 64% vs spread Exching, easy to use, 7-10 picks, 20 report pages weekly, \$150

We'll rush demo disk with Gridstar manual to \$10 NBA Strateoust" inquire, VISA, MC Call SUMMIT RESEARCH 65 High Park Ave., Suite 806 Toronto, Ontario M6P 2R7

(416) 767-7756 IBM FOOTBALL FUN

Have fun with friends and fellow workers, "FFUN" prints schedule of pro grames each week and players pick teams they hope will win Enter all picks into "FFUN" and it will print report of players results after Sunday names and Monday games. No points to pick. Includes 1985 schedule \$29.95 + \$2.00 ship CRITICS CHOICE

PD ROY 1381 POMPANO REACH EL 22061

SOFTWARE FINANCIAL.

**RUN A LAPP AROUNO LOANS** 

LAPP is a completely flexible, friendly Loan Am-ortization Printext Program. Payments may be periodic or inegular for fixed or varying amounts. A variety of interest compounding intervals is also available. Excellent documentation. Satisfaction guaranteed or full refund. Order now! Send \$95 MC/VISA Dealers welcome. Mountain Software Inc

1104 Fernell East, P.D. Box 4364 Hamilton, Ontano LBV 4LB Collect (416) 385-3214

**BOOKKEEPING MADE EASY** 

Fast, flexible, single entry checkbook accounting system in (C). Audit troi is built into normal. use. Special built in saleguards to prevent errors Allows 999 accounts with budgets, 729 departments, or charge cards, bank n

tions, prints checks. Demo \$10 complete \$95.00. Micro-One-Write\* PERMAR & ASSOC-DEPT. PCM 1125 Sunnyhilis Rd Daktand, CA 94610 (800) 443-0100 ext 544

SOFTWARE

GENERAL.

OVORAK KEYBOARO SOFTWARE Want a Dvorak Keyboard for your BM PC? Sure-Stroke translates keystrokes; gives you Dvorak

Typing Coach, transfer letters for key tops, manual, self-molivation audio cassette. Works with Lotus, dBase, WordStar, etc. Stop hunting and pecking-Stroke the Dvorak loday! \$95.00 plus \$4.00 shipping, Visa/MC AMEX or check.

SEASONED SYSTEMS, INC. Box 3720 Chanel Hill NC 27515 (800) 334-5531 (919) 967-5818

SHOP CHEAP—EAT SMART \*COUPONOMIZER-Save more money with your

discount coupons and rebates, 64K \*DET ANALYZER-Lose those extra pounds! Tracks calories + 23 nutrients, Ideal for menu planning, 128 K Immediate shipment, 2 week money back trail \$49.95 ea + \$2.50 s/h Amf's

MC, VISA, Call for free brochure NATURAL SOFTWARE LTD 7 Lake St. STF 7F White Plains NY 10503 (800) 626-2511, (914) 761-9329 in NY (collect)

SOFTWARE

GEOGRAPHICAL

US-ATLAS Locator of 32000 cities. Fed & St Parks on Precoded disk. Color Graphics & Monochrome

Great-Circle distance to any place on earth. 10 by 40 mi strip map display Locates all towns within a given circle. Has 9 options. MONEY BACK GUARANTEE price \$39.95 Uses IBM PC. 192K, 1 disk Drive, PC DOS 2 00 or later. ILLSTON PC-PROGRAMS 1930 Hayselton Dr Jefferson City, MO 85101

(314) 635-3417

SOFTWARE GRAPHICS

35mm SLIDE FROM YOUR PC

COMPUTER SLIDE EXPRESS converts exachin Nes produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monitor Leave your printouts behind.

Use high resolution color sades at your next presentation. COMPLITER SLIDE EXPRESS \$6/ side \$30 minimum order VISUAL HORIZONS 180 Metro Park Rochester, NY 14623 (716) 424-5300

HIGH RESOLUTION GRAPHICS Do you need straighter lines and rounder circles

than can be obtained from typical medium resphilos packages? CONSIDER THE DRAWING TABLETT The Drawing Tablet uses the 640 × 200 must

mode to provide high quality lines, circles, reciargies, squares, friangles, parallelograms, trapszoids, and arcs. · In addition to standard figures, the block

function allows moving, copying, or erasing rectangular areas with the ability to inlay overlay or replace the new block . Parting is easy with 100 different barch sizes in four different shades.

· A library function is provided to store commonly used symbols. This allows the creation of specialized libraries to draw llowcharts. schematics, process flow etc. (A flowchart in

· Drawings may exte can be labelled with the text function. . Drawings can be saved to disk or dot matrix . The Drawing Tablet is meny driven with all

functions selected by a single keystrol Requires IBM PC/XT/AT or compatible with 192K, color/graphics board, and DOS 2.0 or later \$49.95 + \$3 shapping VISA/MC (TN + K SOFTWARE HOUSE RI #2 Box 8381

Unanville, TN 37180 (615) 294-5090

Phone (305) 726-2020

A comprehensive color graphics package for business and other uses. Provides extensive capablities to create mages and text in 100's of colors. Sophisticated color mixing techniques make this product unique. Font generator, slide show. 8&W/color printer, and extensive file system support are provided. User-hendly teafures incude an interactive futorial, online help. and menus. Compatible with Lotus 123, BASIC and most other graphics software. Price \$350. Tutonal/Demo \$20 Gemini Microsystems Inc. PD Box 26684 Fort Lauderdale, Fl. 33320-6684

GRAPHIC PRINTER SUPPORT Al last IBM-PC graphics support for your dot matrix printer Use the P1Sc key to produce quality B&W or color scaled dot matrix repro-

ductions of your display on your Epson, IBM, Okulata, IDS, Centronics, DEC, Anadex, Datasouth, Gerrani, Ti 850, Riteman, Toshiba, NEC 8023 or C floh printers it your printer is not Isled, let us know and we will support it. GRAFPLUS is now available for all versions of PC or MS-DOS and will operate with IBM, Techmar, and Hercules graphics boards. Technologies, Inc \$49.95

JEWELL TECHNOLOGIES, INC. 4302 Southwest Alaska St. Suite 207 Seattle, Washington 98116 (216) 937-1081

FONT GENERATOR

Quickly and easily create fonts—then do them to the printer Any program can access the now set (at printer's fastest speed-ie, cynilic Hebrew, etc. Al 190cps on 1351) Supports OK 92 & 93 Toshba 1351 & EPSON LQ-1500 FONTGEN runs on IBM & most compatibles with mono or graphics screen. Ready tonts avail.

HAC BY 216 Whalen St Brotts, NY 10471 (212) 796-4534

INTERACTIVE FLOWCHARTER

Interactive Facultinum a full screen resolves of gram for flow & organization charts. Very poworful 3 levels of zoom, automatic line routing, automatic liest centering, horizontal & vertical scrolling, 18 sld shapes, user defined shapes easily added, full manual, Remires, 256K and

graphics adapter \$149.95 HavenTree Software Limited PD Box 1093-6

Thousand Island Park, N.Y. 13692 0613) 542-7270 Ext. 50

FORTRAN/PASCAL GRAPHICS

GRAFMATIC (screen graphics): 70 Microsoft/IBM 2.0 FDRTRAN/PASCAL, RM-PROF, DR, SS FORTRAN callable submanines. Pmf. grantics. power backed up by a 100 pg user manual 5 packs more gen utility, 2-D interactive, total 2-D niet susport, 3-D plots, 3-D solid models thursten line removati \$135 H-P H-I Plotter? Toy PLOTMATIC for complete pioter graphics ca-pabilities Interface w/GRAFMATIC \$135 Both

MICROCOMPATIBLES 301 Prelude Drive SAver Spring, MID 20901 (301) 593-0683

#### SOFTWARE HEALTH

CompuMedic PRIVEN Practice Management System-in use 4 yrs. Patient data management, AIR, statements, insurance forms, practice analysis, word processing, recall, delinquent tracking, histor-cal data. FLEXBLE: User designed forms/reports. \$3600. Training. XT/AT. Dental (DentaWare 1), eyecare/optometry (EyeMate 1). and vetermary (VetLogic ") also available. Dealer naunes myte DATA STRATEGIES, INC. 332 S. Juniper St. Suite 210

#### Escondido, CA 92025 (619) 489-9218 SOFTWARE HOBBIES

ROOTS II FOR PC GENEALOGY

Organize your famely tree and print carner family books containing charts led and indeses. Store, retneve and display 1,000's of family facts with biographical sketches and source documentation. Lightning-fast searches and sorts. Display pictures and maps. 250 page manual Salisfaction guaranteed. Write for free henchure \$195 (+ CA tax)

2452 Embarcadero Way, Ste. A. Palo Atto, CA 94303 (415) 493-2184

COIN COLLECTORS! Unique program records entire collection and produces various reports that serve for personal nvestment information. Built-in market value file. provides latest prices for 1600 U.S. corps. COINS software & manual \$55 (demo Preview-Pack only \$15), VISA/MC OK Quarterly COINS value update diskette only \$25 COMPLICATION

6914 Berquest Avenue Suite 101P Canoga Park, CA 91307 (818) 348-3662

SPOT COMET HALLEY-\$52 The heavens at your command. PC PLANETAR-IJM, one brilliantly conceived, meliculously executed, easy-to-use software package. \* Draw a sky map for any location, date, and lime \* Include stars, planets, sun, moon, and Come! Halley \* identity constellations and all objects. \* Print a high resolution sky map I KOUT SW 369 Pine St., Mezz., Drawer B San Francisco, CA 94104 (415) 788-4578

#### SOFTWARE

#### LANGUAGES

 Structured language with BASIC Syntax
 Entersible—Create your own keywords . Modular-Procedures can be grouped together into tibrary modules for higher productivity

. Utilized full PC memory capacity (640K) · Full support for graphics, communications, and screen formatting, \$199, 8087 module \$99 Rutme System \$250, sample \$10 Summit Software Technology, Inc. PO. Rox 99 Rabson Park Wellesley, MA 02157 (617) 235-0729, 1-800-225-5800

#### SOFTWARE LEGAL

ting the Case for Lass LASS is an interactive, user friendly Legal Accounting Software System. It accom client trust accounting, disbursaments and aged accounts receivable. Features include daily/ monthly summaries, trust listings and automatic statements of account. Excellent docu-mentation. Satisfaction guaranteed or full refund. Upgradable demo Order now! Send \$95 Full system \$485, MC/VISA, Dealers welcome Mountain Software, Inc. 1104 Fennell East, P.O. Box 4364 Hamilton, Ontano LBV 4LB

### Collect (416) 385-3214 SOFTWARE

# MAILING

PROGRAMS

MY-T-MAILER"\$30 Our users love this sturdy menu-driven worker. Secretaries say "Terrific" Print labels, 3 x 5 cards. ervelopes, any format Customize labels with line-by-line printer fants. Sort, Search & Select with powerful, flexible, easy user-interface. EZ Browse, Edit, & Delete Print up to 5000 copies of one label Also PCirl Rep. 128K, \$30 JOHNSON SOFTWARE COMPANY POB 16507 Dept 3 Seattle W& 98116

(206) 935-4861 MAIL-SORT

The most powerful program of its kind, yet easy to use. Sorts following U.S. Postal Regulations for 1st and 3rd class bulk mail rates for substantial savings. Name capacity limited by disk space Prints labels 1-3 across \$199.00 Lubbook Software PO Box 220077 FI Pasa TX 79913 (915) 581,0969

#### SOFTWARE MANUFACTURING

MYTE MYKE" MANUFACTURING

**Control System** Inlegrates with Business System. Sid cost provides Bill of Majeral, operations routing, where used, same as except & projection capal Inv. Control. Forecast/Sched, MRP, MPP, Prod. Cost. Prod Diders. Shop Floor Control. Install & succent avait PCDOS MSDOS NOVELL Not-

MYTEL MYKE

M & D SYSTEMS INC. 3885 N Buffalo Rd PO Roy 108 Orchard Park, NY 14127 (716) 662-6611

works, XENIX & LINEX.

TWIN OAKS mrp 2 • 22 Modules Bits/malerial • Inv Control • 128K, PC, XT or AT Purchasing
 MRP & CRP +DOS 10-30 Hard/Soft Dist · Master Schedig Onine Realtime · Phys inventory • Multi User • Std Casting · Accto TWIN DAKS, INC.

Cultage Grove, MN 55016 (612) 458-1604 SOFTWARE MEDICAL

Rox 136

MEDICAL SYSTEMS WITH ECS All PPM products have electronic claims sub-mission (ECS) to medicare & commercial car-

ners, paper claims too . PC + CI AM \$89.95 risims on PC ★ CLAIM w/ICD's, CPT's & HCPC codes \$299.95

 PC + CLAM PLUS claims only wipatient file. ete a claim in one minute \$458. . THRESHOLD . TM \$1995.00 claims. A/R national bifund THRESHOLD \$3,995.00 claims A/R patient. billing, complete practice management, sta-

tistics, analysis CLAIM ★ NET Nationwide claims cleans house Full 100% credit on product upo PC + CLAIM & PC + CLAIM PLUS both house 30 day money-back guarantees. IBM PC/XT/AT/compailbles MS-DOS 256K. Physicians Practice Management 1810 South Lymburst State 2 Indianapolis, IN 45241

(317) 248-0357 In continental U.S. call (ROD) 428, 7616 Indiana residents call (800) 792-3525

ORDIG INTERACTIONS

Computer assistance with potent manag-ment. Enter up to 20 drugs by brand or gener name and get report of possible drug interac-tions. Over 500 drug names/3900 entries in memory, 129K Mono & printer needed. Extremely thorough \$89 (From PA, add 6% tax). Send addressed stamped envelope for sa

Or Richard H Jeffren 4600 Custer Drive Harnsburg, PA 17110

#### SOFTWARE MUSIC

SONGWRIGHT III

MUSICPHOCESSOR privits professional sheel music, with lyrics. Full-screen graphics editor Transposes to any key, plays tunes. Features multiple staff & voices, harmony, counterpoint bass/treble all time signatures. Requires IBM. EPSON or Germin printer. \$49.95 (\$39.95 with out screen graphics). Send for free sample output.

SangWright 928 Fillmore Street, Suite 101 Denver CO 80206 1303) 321,0481

SOFTWARE

OPERATING SYSTEMS

MULTIPLE USERS UNDER PC OOS MuttLink advance turns PC-DOS into an effcient multi-user multi-tasking operating system Additional users are supported by affacting insupersive CRT terminals or moderns to serial ports on the PC, XT, or AT, and can run norms applications designed for PC-DOS, Includes print specifing, keyboard enhancer, and communica-tions software.



THE SOFTWARE LINK INCORPORATED 8601 Dunwoody Place Suite 336 Atlanta, GA 30338 (404) 996-0700

#### SOFTWARE PREVENTIVE MAINTENANCE

#### **MAINTENANCE & INSPECTION**

An easy-to-use computerized method to orga rize, operate, and control an effective preventive maintenance system. Applicable to any type of huseness or industry. Full screen inout and displays, plus function key help command. Main-tains historical data, creates work orders, and provides numerous reports. For info write to: PENGUIN COMPUTER CONSULTANTS PO Box 20465 San Jose, CA 95150 (408) 997-7703

#### DISK DRIVE DIAGNOSTIC Memory Minder, from J & M Systems, is a disk diagnostic program for the IBM PC, PCir & IBM compatibles. It checks your drives for head alignment, spindle speed, hysteresis, azmuth &



J& M Systems, Ltd. 15100-A Central SE Albuquerque, NM 87123 (505) 292-4182

### SOFTWARE REAL ESTATE

**EZ-RE INVESTOR TEMPLATES** Complete analysis package for the Real Estate Investor For Equity Share, Rent House, Apart ments, Warehouses, and Office Buildings Five mortgages can be ARM FHA245, amort, deferred int or int only. Ten year projection of cash flow, deductions, sell price, tax at sell, gain or loss per year and after lax IRR Fanenses, int. rent, and appreciation adjust annually. Also 45 year loan amortization templates. Prof record Requires LOTUS 123 and 256K, \$50 PPD Money back guarantee Visa, MC. LB ASSOCIATES, INC. 8817 Stoke Lan Vienna VII. 22180 /2020/03/6/20003

#### THE PROFESSIONAL REAL ESTATE

ANALYST Fully MENU driven templated program, with HELP screens. Creata a total res. Joomm SALES plog inc/exp. stml, 5 yr. Cash Flow Analysis, Comparison (max 8 CFA options) and Graphs OR bottom line-RR, FMRR, GRM & 10 other measures! Reg. LOTUS & 256K, 14 day trial VISA, M/C or mail \$149 Coral Software, Ltd. PO Box 18543 attle, WA 98118 (205) 722-8410

#### SOFTWARE SCIENTIFIC

MATRIX 100 Powerful Matrix operations with single state-ments in IBM PC BASIC, Perform multiple regression, solve simultaneous equations, invert matrices, etc. MATRIX 100 commands are fast, reliable and easy to use. Price \$80, 8087 Support \$125: compiler support \$250 (\$4 shinping & handling, CA res, add 6.5% tax.) STANFORD BUSINESS SOFTWARE, INC.

#### 4151 Middlefield Rd., Suite 215 Pain Atin CA 94303 (415) 434-0400 SOFTWARE

#### SECURITY

#### **BIT-LOCK® SECURITY**

inexpensive security system protects you from lost profits. Copies will only operate with a BIT-LOCK device attached, BIT-LOCK's powerful multi-layered security has proven its effectiveness on IBM PC/XT, TRS-80, Apple and commodore computers thru the test of time MICROCOMPLITER APPLICATIONS 7805 So Winderemere Circle Littleton CO 80120

#### (303) 922-6410 SECURE AT/XT/PC Control system access, data access! FIXT/S.

Control system boot for most popular XT/PC hard desk controllers Visature for AT and XT-compatthis 4D controllers segments hard disk by volurnes, controls access with passwords, supports hard disk expansion \$80-\$130 + \$3 stop, plus CAtes



**GOLDEN BOW SYSTEMS** PO BOX 3039 SAN DEGO, CA 92103 619-298-9349

# SOFTWARE

# SORT

#### OPT-TECH SORT/MERGE

Extremely last Sort/Merge program for the IBM-PC, XT/AT. Can sort or merge multiple files cong fixed or variable length records. Run as a DOS command or call as a subroutine, plus many other leatures. Now also sorts BTREVE and dBASE If fies! Compare before you buy any other Write or call for more into \$96 OPT-TECH DATA PROCESSING P.O. Box 2167 Humble, TX 77347 (713) 454-7428

#### SOFTWARE

#### SPREADSHEETS

#### 123/SYMPHONY USERS

Comprehensive, flexible application templates designed for the experienced or novice use

 Business Package (22 Applications) \$49.95 Business Accounting, Forecasting Tools, Dept Schedules, Productivity Tools, Real Estate Personal Package (10 Applications) \$19.95
 Budgeting, Scheduling, Rental Property, Networth. 30 Day Money Back Guarantee, Both Plant \$59.95

WestPointe Softw 733 River Drive St Louis, MO 63088 (314) 225-4226

#### SOFTWARE STATISTICS

# Guard your valuable software from PIRACY Our

SIGSTAT includes over 30 programs of the BMD statistical series, plus many advanced new leatures Mainframe capacity (up to 60 var.) for uni-(e.g., ANCNA, regression) + multivariate (e.g., canonical, factor) analyses, time-senes, idim scaling, crosstab, plots, q/c and more. 8087 support opt 256K, DOS, \$595 SIGNIFICANT STATISTICS 3336 N. Carvon Road Provo, UT 84604

#### (801) 377-4860 **NWA STATPAK**

Portland, OR 97709

(503) 224-7727

Powerful data manipulation utilities, ASCII data structure for interface to databases, word processors, etc. Statistical functions include probability, descriptive statistics, regression and correlation, non-parametrics, distribution functions, means lesting, survey data analysis. & ANTHO SASS NORTHWEST ANALYTICAL, INC. 520 NW Daves St

#### STATISTICIANS MACE 2 NO A tuil feature program calculate multiple

regression, correlations, several Anovas, nonparametric tests, descriptive stats, data transformations & much more Read data from keyboard of files created by spreadsheet data base. WPS etc. for IBM PC/XT/AT/PC/r & compatibles Buy direct or from dealers. \$255 The Matrix Calculating Engine (Mace) Inc. 2313 Center Am Medison, WI 53704 (6001-044-2221

#### **RATS Statistical Package**

RATS brings powerful and mex cal and econometric computing to the PC. It is a fast, accurate package that performs regression analysis; time-series forecasting, including Box-Jenkins, and cross-section analysis, including logit and probit RATS can read data in many forms, including Lotus WKS files. RATS also ofters programming features that provide maxi-mum feobility and power Spectral analysis and graphics are available as options. Requires 256-K RAM IBM or compatible. Base program: \$200. Demo including 300 page manual \$40, MC/ VISA

#### VAR Econometrics 134 Prospect Ave. S. Minneapolis, MN 55419 (612) 822-9690

#### BRISK too

 Multiple Stepwise Regression 39 variables
 ANOVA 10 factors, with repeated measures · Cross tabulation with interactive collapse of rows & columns & Chi squared + 9 others

#### Many more state • 40 variables, 32,000 cases 40 data transformations and a complete set of data management utilities

#### · 30 day money back guarantee, VISA/MC CRUNCH SOFTWARE CORPORATION (415) 564, 7337

#### STATPLAN II

Statistical software. Easy to use, menu drives full screen data entry and editing, complete graphics displays, cross labs, ANOVA, multiple regression, curve fitting exponential smoothing seasonality Interfaces with Lotus 1-2-3, dBase II, If and ASCII files. Only \$99 THE FUTURES GROUP 76 Eastern Blvd.

#### Glastonbury, CT 06033 (203) 633-3507

#### SOFTWARE TAXES

#### TAXTIME" FOR 1-2-3"

IRS & State approved tax preparation and pla ring terrolates for use with Lotus 1-2-3. Highly integrated, flexible, last, and easy to use. Far surpasses all other tax sorearish many CPAs. Individual 1040 (320K) \$95/\$45 Corporate 1120 (320K) \$195/\$75 Partnership 1065 (265K) \$195/\$75. Calif 540 (256K) \$95/ \$45 New 5 year planners plus states: 1040 (320k) \$195/\$75 1120 (512K) \$295/\$95 Coming soon. Federal 1041 plus NY, NJ, E., AZ, Call toll free for detailed catalog. Austin Scientific Inc 1259 El Carrino, Suite 260 Mento Park, CA 94025 USA (900) 227-3900

CA (800) 632-2122

#### RLUEBOOK

INTRODUCING TIME TRACKER TIME TRACKER automatically keeps track of corrouter usage and prepares detailed reports. This is a must for income tax records, billing, austifying additional computers, and monitoring computer usage Utilizes windows and functi keys. To get the most out of your compute need TIME TRACKER Visa/MC/Check/COO.

\$21.95 + S/H K O Wate Dent 30 PD Box 712 DeKath, E. 60115 (815) 756-8286

#### SOFTWARE TERMINAL

# EMULATION

ARR/HASP INTELLIGENT RJE WORKSTATION Bundled hardware and software for IBM PC, XT and AT. Transmits data to host and rec put smultaneously Emulates IBM 3777-2 and HASP on IBM 360/20. Line speed: 1200 to 19200 Baud (56 KB on AT). Supports multiple highspeed printers beyond 2400 lpm (7000 lpm on All) Features menu-driven, printer forms con-

trol, plotter support, unattended operation, easy installation, \$890 cornolete. BARR SYSTEMS, INC 2830 NW A1st Street Carrevalle FL 30606 (900)-BARR-SYS/(904) 371-3050

#### THE IMPERSONATOR The most flexible terminal emulation program. liser can modify one of the 12 emula

tained in the package VT100, IBM 3101 & TV 950 or custom design additional ones with the built-in communications "tanguage" Virtually unimited asynchronous capability. For the IBM PC and compatibles \$245 + s&h. MC/VISA/ COO 1-(800) 643-8090.

# DIRECTAID

DIRECT AID, INC. P.O. Box 4420 Boulder, CO 80306 (313) 442-8080

#### TO. I INK

The TC-3274 Cluster can be used on all IBM PC's or compatibles 1, 3, or 5 station clusters from \$769 Features: Extended color Resident SNA. Application Interface, Hot Key, Full Gateway, Fast File Transfer, Multiple LU's TC-3276 single user Emulator is only \$619. Over 5000 SNA & BI-SYNC sold Worldwide TRISYSTEMS CORPORATION

74 Northeastern Blvd. Nashua, NH 03062 (603) 863-0558

#### MicroGate BSC EMULATION tion: MicroGate/ws provides both remote

Our MicroGate family offers complete BSC em-3270 & RUE links, MicroGale II is a prog mable BSC subsystem to COBOL, C. BASIC, Etc.; MicroGate 2780/3780 is now the standard to which other PC RJE links are compared-all come

with our unequaled customer support. GATEWAY MICROSYSTEM 9501 Capital of Toxas Highway Austin, TX 78759 512,345,7791

#### VT 100 on PC, jr, XT, AT, 2STEMec. VT100 Smart Terminal Finulal 132 columns by windowing-no addit. hard-

ware Double High/Double Wide Characters. Complete VT 100 line graphics & Smooth scroll. Full keyboard softkeys/MACROS. International Font Support, EGA Sup File transfers: ASCII, XMCOEM, KERMIT Rates to 38 4KB. High throughput. \$150.00. Quantity, dealer discounts available 30 day money back quarantee. MC/Visa accepted.



KEA SYSTEMS LTD. #412-2150 W Broad Vancouver, BC, Canada V6K 4L9 Support (604) 732-7411 TLX 04-352848 VCR Toll Free Order Line (800) 663-8702

### SOFTWARE

TRAINING

THE AUTHOR PLUS COLOR\* THE AUTHOR PLUS COLOR is a new versatile reliable easy to use COLOR computer authoring system. THE AUTHOR PLUS COLOR includes: . 16 colors for text and graphics

 7 trame types 6 Types of learner in And much more ... IBM PC/XT/AT contact us. RAPTOR SYSTEMS, INC. 324 South Main St Striwater, MN 55082 (512) 430-2980

### SOFTWARE

TYPESETTING

HIGH-TECH TYPESETTING Transmit your text via toll-free lines directly to our fully automated typesetting system, \$2 per K characters with a \$5 minimum. Same day service 200 typelaces in sizes up to 72 point. Send \$15. + \$3. shipping for our 220 pa

book, or call toll free and use your MC, VISA INTEGRAPHICS INC. 106A South Columbus Street Alexandria, VA 22314 (800) 368-3342 or (703) 663-9414 in DC area

#### SOFTWARE

LITHLITIES PADLOCK/PADLOCK II OISKS PADLOCK furnishes the user with a method for

providing protection against unauthorized du-plication from DOS commands \$99. PACH DOS Il disks come preformatted with finger-print and serialization. PADLOCK II disks offer superior protection. Ask about our PRIVATE TALK product. All work with hard disk, EXE/COM files and at DOS versions, MC/V/SA.

LENCO ENGINEERING 3920 Ridge Ave. Arigotton Hts. II 60004 (312) 392-2492

SCREEN MANAGEMENT SYSTEMS SMS is simply the best utility available for de signing, using, and saving color/menochrome screens GOSUB's are supplied in BASIC to in put, output, and edit screen data fields. Loads of extra features. We have been in business 15 years, winning many awards for programming excellence. Price \$195, demo \$50, Manual \$10 VISA/MC PC/XT/PC # /E4K/1 Disk.

DNA SYSTEMS, INC PO. Box 1424 Saginew, MI 48605 (517) 793-0185

PERSONAL COPIER\* Personal Copier copies EVERYTHING! and, our monthly trade-in offer GLAPANTEES that you're

up to date with new and ever changing protection methods, Fully automatic with easy-to-use two-step graphic screen instructions arryone can use it Every IBM PC used should have one \$40.95 a \$3 c/h MCANSA STOP SHUFFLING ELOPPIES WITH DISK LESS" The turn way to transfer copy protected software to conver hard disks. Operates with Lotus 1-2-3, Symphony, Sidekick, Electric Disk, and more ... call for our complete list. Another Personal product

from Disk-Tech. See our display ad in this issue. DISKTECH

DISK-TECH\* PO Box 152 Weem II 60183 (312) 365-2603

\$50 per Megabyte for IBM/XT MCFORMAT software adds 15% to 50% to hard disk capacity by aflocating space in smaller units

than PC-DOS, thus wasting less space. PC/XT users get at least one Mb (33Mb hand disk users get up to 10Mb) more useful storage with fully compatible PC-DOS 3.0 or 3.1. \$50 prepaid including shipping, VISA/MC. Microcomputer Concents. Inc. 9715 S.E. 43rd Street Marcer Intered WA GROWN (206) 236-2300

FAST, SMART XT BACKUP

BAKUP\* does daily backups in less than 5 min; a full (10MB) backup in less than 30 min. Uses floorey desics, cardidge disks, etc. on XT, AT or compatitie. Unique catalog of backed up files speeds restoration & prints backup reports. Includes 50 diskette labels. 30-day money-back

# quarantee \$179.95, Visa, M/C, PO or COO.

SOFTWARE INTEGRATION INC For more into: 213-776-3404 (800) 538-8157 Ext. 801 (USA) (800) 672-3470 Ext. 801 (CsM)

TurboPower Utilities Nine Powerful Tools for Turbo Pascal users or PC/XT/AT & compatibles-Pretty Printer

Structure Analyzer, Execution Timer & Profiler Pattern Replacer; File Differencer; Command Repeater & more See ads in Byte & PC Tech for more info, OSDO disk & 130 pg. mariual: \$55 With source code & theory: \$95 TurboPower Software

478 W. Hamilton Ave., #196 Campbell, CA 95006 (800) 538-8157, x 830 (CA) (800) 672-3470

INTEGRATEO CONSOLE UTILITY FANSI-CONSOLE" faster screen writing thru PCDCS or BIOS (1.3-3.0+), larger X3.64 subset than ANSI, SYS, UT100/52 keys, more type ahead, auto screen disable, no scroil blink for

some adapters, window support, keyboard breakets & macros, scroll recall. Shareware disk \$25 or disk & 250 p. manual \$50 (MI + 4%). HERSEY MICRO CONSULTING INC

PO. Box 8276 Ann Arber, MI 48107 (313) 994-3259 voice, 994-3946 BBS (11pm-

PEEKS 'N POKES ... and more

Thousands of programmers enhance their pro-mours and save time with PEEKS 'N POKES! The disk (58 programs) & manual show you how to access and modify system status, perform DOS & BIOS function calls from BASIC or Pascal, and much more for only \$30. Want more? A perfect companion package, THE INSIDE TRACK, gives your programs assembler-assisted speed plus control over the keyboard, memory, programs,

etc. Disk (61 programs) & manual for just \$45. Shipping \$2 50/order MC/VISA. DATA BASE DECISIONS 14 Roppie I any Atlanta, GA 30328

(404) 256-3860 (800) 722-7006

# Hard Disk DIRECT ACCESS"

The ULTIMATE utility for any hard disk user DI-RECT ACCESS is a powerful hard disk management tool. Organizes your software programs into a "user defined" menu system. Features attractive screen display, rapid access into an applim using a single keystroke & easy to learn Also handles batch files & complicated DOS commands. Order today. Only \$59.95 + \$5.00 shipping MC/MSA



DELTA TECHNOLOGY INTERNATIONAL INC. PO Box 1104 Eau Claire, WI 54702 (715) 832-0958

COMPUTER SYSTEM LOG Monitor activities on your computer with SYS-LOG. The System Log Utility is a command driven norresident DOS extension that allows automatic task recording. With SYSLOG, all of your computer time is noted, saved, and categorized.Reports printed for tax purposes or for monitoring PC usage Only \$34.95 + Sh. VISA/

# SYSTEM LOG UTILITY

Apex Resource, Inc. 23 Christine Court Stormville, NY 12582-9612 914-221-2611

UNIVERSAL CROSS REFERENCER One Class Referencer does it all for BASIC, C., Pascal, FORTRAN, Modula2, COBOL, DBASE-II. Macro Assembler, etc. User-defined page titles, page numbers, file date/time.Unlimited symbol length, adjustable output margins, compressed print. Multiple input files, Full directory and support, DOS 2 x, IBM PC/PC-XT, 128K, \$39.95. **DALSOFT Engineering** 

3565 High Vista Daltas, Texas 75234

THE FASTEST MENU IN TOWN Fast, flexible, and easy to use, Omenu allows the novice to use a hard disk system to its fuffest. Supports nested menus and password protection, All color defaults can be changed. Menus are easily modified and can be set up with any text edition or the included menu generator. \$49.95 (site ficense available).

DannySoft, Inc. 132 East 45th Street Suite 5G New York N Y 1001 (212) 370-1697

1

#### COPYWRITE

CopyWrite backs up hundreds of the most popular copy-protected programs for the IBM PC CopyWhite is revised monthly to keep up with the latest in copy protection, and comes with a trade in offer. It needs an IBM AT, XT or PC, 128K & one disk drive, but can use more memory or another disk drive. \$50 US. Check/Credit Cards. **OUAO SOFTWARE LIMITED** 45 Charles Street E, 3rd Floor

MEDIA MASTER PLUS Read, write, and formal over 60-CP/M disks and run most CP/M-80 programmed on the IBM-PC Two program pockage includes ZP/FM and CP.

M80 emulator program that transforms your IBM-PC into a 1-2MHz CP/M 2.2 computer \$59.95 +\$3 s/h (CA-residents add 6% tax) Intersecting Concepts. Inc. 4573-Heathergien Court Moore Park, CA 93021

(805) 529-5071

Toronto Ontano CA MAY 192

(416) 961-8243

LABLMAKR, PC This workhorse program prints highly visible, extra large "jumbo" as well as standard type. For

labels, tags, tabs, notices, tents, etc. 26 standard label formats allow many more variations. even on non-standard size forms. MS-DOS systems and most dof-matrix printers. Request brochure or no-risk order, \$49.00

FTS Cente Box 651, 35026-A South Turtle Wilcuphby, OH 44094 216/946-8479

SWAP DISKS WITH CP/M MICROS Uniform-PC lets you directly read, write and format data diskettes from any of over 30 CP/M

micros, 8-bit and 16-bit, theoperaise and ea to-use UniForm-PC emulates the selected Cl M drive at the touch of a key, For PC/PC-XT/PC-AT and compatibles. Requires 128K, two disk drives, PC DOS 2.0 or higher. Only \$69.95, MC/ VISA

Micro Solutions 125 South Fourth St DeKalb, IL 60115 815/756-3411

#### SCROLL AND RECALL A resident screen and keyboard or

utility. It captures the data that goes off the top of your display screen and allows you to scroll back through this data or save it to a disk file. Also saves your DOS commands as you enter them and allows you to recall, edit and re-enter previous commands without retyping \$69 OPT-TECH DATA PROCESSING PO BOX 2167 HUMBLE, TX 77347 (713) 454-7429

MENUS FOR PC/COMPATABLES

Countiess sorted user designed menus for Color or B/W screens. Add and Remove menu items. with the Insert and Delete keys. No word processor is needed. Password Protected Merpillens. Screen Saver, constant TME/OATE display shows day of week. Help screen. List \$59.95. Manual \$9.95. Requires DOS 2.X, 128K RAM,

CUSTOM COMPUTER SOFTWARE 231 Mendon Street Lixbridge, MA 01569 0617) 278-5137

AT/XT/PC HARO DISK EXPANSION Replace hard disk with a bigger one, or add a second drive! Vileature supports high-cape drives on standard AT, XT, and compatible hard disk controllers, includes multiple volumes, seatures, selectable clusters, keyboard lock \$80-\$120 + \$3 shipping + CA tax



GOLDEN BOW SYSTEMS PO BOX 3039 SAN DEGO, CA 92103 519/298-9340

TEXT FORMATTING

Easy menu setup for creating BROCHURES, BOOKLETS, GREETING CAROS and more DigiCon Print Package for BM/EPSON printers SECTIONS test files for printing. Choose character style, size, margins, etc. Prints SIDEWAYS as well. Includes interactive char editor to CRE-

ATE YOUR OWN FONTS, \$49.95 (PA + 6%), chil DIGITAL CONCEPTS, INC. P.O. Box 6345, Dept. B Pittsburgh, PA 15218 (412) 823-8314

Copy II PC is the backup insurance you need protect your software investment. Copy if PC makes floopy backups of most protected software quickly & easily, and even allows several to be run from a hard disk without a floody in At (Call for current list.) For IBM PC, XT, AT, 2568 F Also available for Apple 1, Mac, CSA, \$39.95 + \$3 s/h VISA/MC/check

Central Print

CENTRAL POINT SOFTWARE, INC. 9700 SW Capitol Hwy . #1008 Portland, OR 97219 (503) 244-5782

**HP LaserJet Setup Utility** 

SETHP: a simple menu-driven and/or batch utility that allows full control over your HP LaserJel printer, Supports 7 font cartridges. Control margins, number of capies, lines per inch, lines per page, etc. Over 125 commands. Only \$49.95 + \$4 S/H CHECK/VISA/MC. flinds residents add



ORBIT ENTERPRISES INC PO Box 2875-M Glen Ellyn, IL 60135 (312) 469-3405

#### SOFTWARE WORD

PROCESSING

PC-WRITE" Features' wordwrap, search/replace, justify, block move/copy/delete, headers/looters, etc. Help screen, quick rel card, 100 page manual Split screen, edit two files at once. Disk with software and manual \$10; registration with support, source, and commissions \$75. Shareware can copy and share with others. Visa/MC DUICKSOFT

219 First North #224c Seattle WA 9810 (206) 282,0452

MY WORDI IS JUST \$35

Emulates ws. Full-leatured, full screen wore processor for IBM PC/XT/AT/jr or competities Wordwap search/replace: block oos, headers. & footers sort adds row/column calculator macros; merge-print; quick print; 256 CHARS Allows color & customizing 100 + gps, won't lose text, utilities; translate ws files to ASCII or back Help screen, printed manual (Index/table of contents); fully supported Source and \$35 DOS 1.1-3.0, 128K, 1 drive, use any printer, 30 day money-back guarantee T.N.T. SOFTWARE INC.

34069 Hainesville Road Round Lake, IL 60073 (312) 223-0830

WORD PROCESSING PLUSI

SEF supports optional microsoft mouse: block

pick, put, cut, posts, center, wrap, justify, search replace piphal replace shell check conset from supplied + user dictionary; multiple windows & Nes Instruction course included Also 8 deal utilities including Attrib," Crypt, DrSort, Find." Rename, "supports MS/FINS wildows. pathspecs \$49 for all 9 programs. \$79

CALIFORNIA SCIENTIFIC SOFTWARE 25642 Hazelruf B Toro, CA 92630 714) 581-7654



# Spending more time searching for the technology...than using it?

# DATA SOURCES systematically organizes all your DP options!

No other resource puts over 20,000 systems and applications software packages...over 17,000 hardware and data communications products...and some 9,000 company profiles instantly at your fingertips.

DATA SOURCES is conveniently indexed to help you locate the products you seek quickly...find others you may not be aware of...and determine their capability and compatibility at a diance. You'll use...

... The Product Index, with its complete listing of every product covered by DATA SOURCES, to lead you to the larger listing quickly.

...The Company Profile Index, to help you identify all the product areas in which a firm is currently involved easily.

...The Company/Product Index, to find each vendor's full range of products within each equipment category instantly.

...The Software Index, to help you access specific packages, even if you're not sure of the author or product classification.

And DATA SOURCES' handy comparison charts let you review similar products by multiple manufacturers for key criteria, including compatibility and price.

PLUS...in-between quarterly editions, subscribers have access to the exclusive DATA SOURCES HOTLINE for information on product location assistance. JUST CALL (800) 227-1617 ext 251 TODAY! (In California, call (800) 722-3543 ext. 251)

722-3543 ext. 251)
We'll send your first 2-volume edition
on a 30-DAY APPROVAL basis
and enter your year's

subscription to
DATA SOURCES at
just \$170...\$70 off
the regular cover
price...FOR 4



DATA SOURCES eading the Industry in Information

Management P.O. Box 5845, Cherry Hill, N.J. 08034

1684



Of all the products advertised in this issue of PC Magazine, there are dozens you'd probably like to know more about. Handfuls you might be interested in buying.

Now you can have pertinent, comprehensive information about these products right at your fingertips, and it won't cost you anything. Only a minute of your time.

The manufacturers and distributors of these products have colorful and informative literature available. If you're interested in receiving these brochures, PC's Reader Service Program can help.

Simply follow the instructions described below and PC will forward your requests for information to the appro-

priate advertisers. Before you know it, you'll have a complete and handy product reference file.

While you are looking through PC Magazine take advantage of this handy flip-open card to

circle the numbers as you see products that interest you.

Getting free information about products advertised or mentioned in this issue of PC is as easy as 1-2-3.

Each ad in the magazine includes a reader service number. (These number best are repeated on the advertiser index, as well) If you'd like more information about the product or products described in a particular ador feature, circle the corresponding number on the attached can.

Fill in your name and address in the space provided. Please: only one card per person.

Mail the card today ... It's <u>postage</u> <u>paid</u>. And watch your information file begin to grow.

NOTE: This card is to be used for product information or subscriptions only diational inquiries should be directed to PC Magazine. One Park Avenue New York, INY 10016. Now is also an ideal time to become a PC subscriber. See the back of this card for details about our special offer for new subscribers.



IF YOU ARE A PROFESSIONAL PC USER...

IF YOU SEETHE
PC AS AN INVESTMENT
OR IMPORTANT
BUSINESS TOOL...

IF YOU WANT TO MAXIMIZE YOUR PC PRODUCTIVITY...

HERE IS A SPECIAL OFFER YOU WON'T WANT TO MISS! Now you can receive 24 blweekly issues of PC Magazine for only \$21.97—less than 92 cents an issue!

The money PC will help you save will cover the cost of your subscription more than ten times over!

How?
In PC Magazine, you'll find in-depth and
thorough product reviews that will help you
make informed and appropriate buying

decisions.
You'll learn about innovative applications...project management, communications and graphics ... and how to put them to use on your PC.

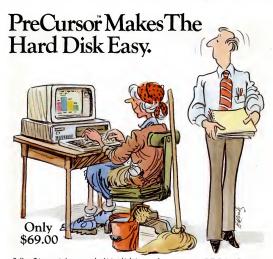
You'll hear industry news first-hand, and how forward-thinking professionals are using their PCs to further their business agals.

What's more, you get all this information every two weeks, giving you a decided edge over colleagues who rely on a monthly publication.

Your subscription to PC is your guarantee of the most up-to-date and comprehensive coverage of innovations and applications that will help you maximize the performance of your PC.

So don't miss out. Act now on PC's special offer and get 24 issues for only \$21.97. Fill out the attached reader service card and check the subscription box. Or, call toll free, 1-800-852-5200.





PreCursor™ is an amazingly compact and sophisticated indexing system for your hard disk. It runs just ahead of your other applications and makes some very user-friendly arrangements. And at a very businesslike price.

Without PreCursor™, it takes a whole manual of commands to find and execute programs from your hard disk. In a business setting, where novice users must access your system, this is aggravating and expensive.

Tailoring PreCursor to your system is an easy operation. On-line help is available at the touch of a function key. A triple level of password protection is built right in. You don't need to know paths or subdirectories or other complicated syntax. You can even change the color of PreCursor"

After PreCursor™ is setup on your hard disk, it greets you each time the machine is turned on with a list of available programs. You can make simple index choices of even the most complex DOS commands. And set up your printer with the speed and ease of an old pro-If you're a sophisticated user, you'll love the convenience of full interaction

with batch files, passable parameters and user prompts. Home users will appreciate the sure ease of operation. If you depend on your hard disk for businesslike performance, you can rely on

PreCursor™ for instant access Thanks to PreCursor ", The Hard Disk isn't so hard anymore.

CIRCLE 198 ON READER SERVICE CARD

heCuray<sup>la</sup> will run on IBM computible MS-DOS systems. BM is a registered trademark of International Susiness Machines Corporation.

Here's my order for	соры	s. Make m	y hard dai	cary
Find my check for \$69.00 postage and banding)	each enclosed	iplus \$5.0	0 for	

☐ Please charge this purchase to my ☐ Visa ☐ MasterCard

IO-DAY MONEY BACK GUARANTEE



SEA PRODUCT   ADVERTISER	p	C Pro	duct Ir	nde	Y			
10	_					PRODUCT	ADVERTISER	PAGE#
10	DISK	OPERATING SYSTEMS			SORT	MERGE TOOLS		
ACCOUNTS OFF VARIE    10		Qk M	Que Research Inc.	206	192	Sees Merge Tools	Computer Control	267
ACCOUNTS OFF VARIE    10	392	ONX Windows Dat Date	Quantum Solivare Systems, Ite	60	TEXT	EDITORS	Comment To broken Com	776
## ADM ACCASIONAL PROPERTY AND	ACCO	UNTING SOFTWARE	Langua Intercepto	110114		R UTILITIES		
REPORT   ACTION   No. 19   A	148	Accounting Software		200	317	Personal Copier Salescens		253
NITSEARTH ACCUSTNING PARCAGES   Section   1	243	Accounting Software	In-House Software	37	340 346	Dox Mechanic Notice Distance		257
Common   C		RATED ACCOUNTING	PACKAGES		768 768	No State Hard Roomer		19
COMMINISTATIONS SOFT WAR.  COMMINISTATIONS SOFT	263	Window-Manier, Structured Systems	Indian Reign Emergence Inc.	13	HARD	WARE		
Common   C	COMM	MUNICATIONS TOOLS				Video Show CECORN CARDE	General Parametrica	169
March   Marc	305	Tem Oe	Dynatech Computer Products				MicroWay	H
TABINITAL PARTICIPS	COMA	CUS 107679+	CXI	39	IBM P			
### CALL TOPS NO. COLUMN STATES AND COLUMN STATE	TERM	INAL EMULATORS			200	EFF Eatra	Hi Tech International FFT Information Systems	145
OFFINAL PRINCIPLE   1997   1	140	Smarterm/PC CXLS 3278/79+	Penell CXI			Personal Computer TELLINGTION POARD	NCR	220-221
Management	OTHE	RUTILITIES			101	So Più Pin		
File	206	Copy II PC United Software		250	VIDE	OK IS OR OF BOARD	On Research	200
CREAPILES SCIENTISS   Company   Co	EINI A N	CIAL DI ANNING COUT	Sobiek WADE	24		Color Graphics	AST Research	. 52
CREAPILES SCIENTISS   Company   Co		Computed	A S Gebon & Son	47	146	Hercules Graphic Card Hercules Color Card	Hercules Computer Technology Hercules Computer Technology	115
12			Heale			Modular Graphics Card	Paradae System	ii
March   Marc		Monographs	Analytics International Inc	- 243		Accessores	Curtis Manufecturing	- C2
RECORD ALTON MANAGERS   1	221	The Craphia Partner Diagram Master			334	CTOD ACC UADDAWARD	Мкижа	
Comparison   Com	177	Video Show					Bac Pac International	292
ROBERT LANAGERS   1	INFOR	MATION MANAGERS					Core International Devot Aldreder Co	
ROBERT LANAGERS   1		"Pop-Upa"	Behoft Manual	111	160	Tape Backup Hard Dick	Experis Systems Inc 182 X Communic Com-	
The content of the	PROJE	CT MANAGERS			132	Irwin Bocksp	Irwin Magnetics	
OTHER   NICHAM TOON MANAGERS	129	Project Manager, Workbeach Project Planner			178	Desk Subsystem Desk Davie Torre Back on		
Free   Part		Project Scheduler Network	Scinor Corporation	. 123	COM	MUNICATIONS HARDW	ARE	
STOPP ASS   CORPORESSON ASS   Control   Cont	OTHE		Come Technology	790	226	Mac Charles		2.5
March   Marc		Right Choice	Earls Publishing	200	MODE	MS PC Modern Hold Corol	Ves.Tel	
		Home Base	Amber Systems	30-31	NETW	ORKING		
Section   Sect	147	Super Key Swirksch	Burland International		DATES	OIC 60	Qsc Research	. 200
STATISTICAL SOFTWARE	ENGI	EERS/SCIENTISTS			185	NMS PC 4000	Nanonal Memory Systems	
STATISTICAL SOFTWARE	497	Mathpat Fersonal Finance Master	Hauppauge Specimen	241	124 393	Easy Lan Makshini, Advanced	Server Technology Software Link, No.	
WARD PROCESSING SCHTWARE	STATI	STICAL SOFTWARE			DISPL	AYS/MONITORS		
15		SPSSEC		147		Sony Mondae T.D.C	Sony Information Products	162 163
Proceedings	162	World Result			108	Protects	Centronics	297
WORD PROCESSING AIDS	ix	System 36 PC Word Perfect 4 0	Swelling Software Im 1 (551)		163	Pro Propier	Faytou IBM Information Systems Group	. 155
WORD PROCESSING AIDS	:	X <sub>2</sub> Winne	Software Publishing	295	255	Mail Order Proters Okadasa Printers	Okidate  Okidate	. 46-45
10	WORL				203 153		Printerland Ranshamer of America	264
No.     No.     No.	176	Laser Print Soft Type	Honor Software Inc	198	202		Toshuba Xenon	234-235
March   Marc				237	FONT	\$		
10	MULT	IFUNCTION SOFTWAR	E		6610	Pages Fire II	Sell Craft	.231
TITES   TITES   SOFT NABE	320		Extys Inc Micro Dynamics	263	104	Agrisch Duny 1120	Agreed	218
TITES   TITES   SOFT NABE	144 527	Public Domain SoliWare Free Public Domain Soliware	PC Software Internst Group Public Domain Software	253 266		TERS, ETC.		
Note   April   Self Prince   April   Self		SETTING SOFTWARE					Hewlett-Packard	233
15	334		Lebough Software Corp	- 23	175	Printer Boss	Connecticut Software	25
COMPILES	216	Omenii	Matrix Software Technology	C2	FURN		Harring	26
10		Note II	Turner Hall Publishing	236,237	220	Computer Furnisher	Samonton Industries	. 16
10		Pacal Family	Borland International	100	DISKE	TTES	Part Mandager	- 24
10	113		Lance, Inc	226	244,240.			
Compared and Com	PROG	RAMMER'S TOOLS	Letter by	276			Disketse Connection	242 280,288
The Proceedings   The Proced		C-Sprite, Panel, dBC11 dBC111.		2.00	ACCE	SSORIES	1-14	
Description   Proceedings		Test Management District			136	Proves Conditioner	Computer Accessories	175
DATA BASE MANAGERS	138	Serren Sculptor	Software Bostlag	20.21	PRE-P	RINTED FORMS		
1		BASE MANAGERS	duran la		OTHE	R SUPPLIES	Advant Contract Course	29
PROGRAM DEVELOPER/GENERATOR TOOLS  37 D Base Enhancements Fox & Celler 250 EFFEC AT THE EFFE AT	210	R Base		56-57			Micro Computer Accessories	171
267 D Base Enhancements Fox & Geller	PROG	RAM DEVELOPER/GEN	FRATOR TOOLS		316	The Rolling 100 Deal File.	Micro Compiler Accessories	. 171
289 1879 770 2007 787 1879 1879 1879 1879 1879 1879 1879	247	D Base Enhancements	Fox & Geller	250	LITER	ATURE		
	156	Stat Graphics	STSC	. 149	142	The Manual	Management Information Source	

# Compuclassics

SOFTW	ARE	SOFTW PFS Far Write File Graph
DATA BASE MANAGEN	ENT	Access
		Plan Report
ALPHA SOFTWARE Data Base Manager II	Our Price 179.00	Proof
ASHTON TATE	170.00	XANAR
dBase III	369.00	Ability
FOX & GELLER		GRAP
QuickCode III	145.00	DECISI
QuickReport III dGraph III	145.00	Chartm
LEADING FORE	140.00	Signma
Nutshell	79.00	Or Oray
M.D.B.S.		Gem 0:
Knowledge Man	249.00	1831
MICROPRO		PC Pain
InfoStar +	189.90	MICRO
MICRORIM rBase 5000	350 no	PC Ora
Extended Report Writer	89.00	Chartsta
MICROSTUF		MICROS
Infoscope	125.00	Chart
NANTUCKET Clipper (dBase III Compiler)		PROJE
capper (dease III Compiler)	429.00	LUM

MICROPRO	
Wordstar	179.0
Wordstar Propak	249.0
Wordstar 2000	245.0
Wordstar 2000 Plus	295.0
MICROSOFT	
Word	239.8
NULTIMATE	
Multimate	219.0
DRERDW	
Oberon Omni-reader	469.0
SAMNA	
Samna Word III	249.0
Samra +	339.0

**WORD PROCESSORS** 

LEADING EDGE with Merge & Spell

LIFETREE

Word Perfect 4.0	229.0
INTEGRATED SOFT	WARE
ALPHA SOFTWARE	
Electric Desk	189.0
ASHTON TATE	

SATELLITE SOFTWARE

OFTWARE GROUP	339.00	G.P.
		0.4

FTWARE	PUBLISHING
S Family	

	PFS Family
L	Write
	File
	Graph
	Access
	Plan
	Report
	Proof
	XANARO
	Ability
	- and

Aprily
GRAPHICS
DECISION RESOURCES Chartmaster Signmaster
OIGITAL RESEARCH Or Oraw

Gem Oraw
I.M.S.I. PC Paintbrush w/Mouse
MICROGRAFX PC Oraw
*****

AGEMENT

225.00

	Chartstar
	MICROSOFT
ı	PROJECT MAN
	BREAKTHROUGH

140.00	HARVARO SOFTWARE Total Project Manager
149.00	MICROSOFT Project
179.00	SCITOR Project Scheduler 5000

SUPERPROJECT
SPREADSHEET
LOTUS
Lotus 1-2-3

Multiplan
SORCIM/IUS Supercalc III Release 2
COMMUNICATIONS

HAYES	
Smartcom II	
MICROSTUF	
Crosstalk XVI	
Remote	

G.N.P. C.P.A. +	1
Order desk & technical supp 8 a.m. to 6 p.m. Monday - Pr 10 a.m. to 2 p.m. Saturday	

desk &	technical	support.	006
to 6 p.	m, Mendas	- Priday	
to 2 p	.m. Saturd	lay	

1.0.5.	
Al Modules	279.00
Payroll	329.00
Easy Plus	55.00
OPEN SYSTEMS	
All Modules	339.00
Business Basic interpreter	165.00

Business Basic interpreter	165.00
REALWORLD All Modules	399.00
PROGRAMMING LAN	GUAGES
BORLAND INTERNATIONAL	
Turbo Pascal 3.0	35.00
With 8087	59.00

With 8087 & BCD	75.00
Turbo Toolbox	30.00
Turbo Tutor	19.00
Graphix Toolbox	30.00
DIGITAL RESEARCH	
C Basic Compiler	360.00
LIFEBOAT ASSOCIATES	
Lattice C Compiler	299.00
MICROSOFT	

Lamce C Compiler	299.00
MICROSOFT	
Fortran Compiler	229.00
Pascal Compiler	199.80
Macro Assembler	95.00
C Compiler	249.00

UTILITIES
BORLAND INTERNATIO
Sidekick
Sidekick (Unprotected)
Superkey
CENTRAL POINT

Superkey
CENTRAL POINT
Copy II PC
OIGITAL RESEARCH
Gern Desktop
FUNK SOFTWARE

Norton Utilities
DUAID SOFTWARE
Zero Oisk
ROSESOFT
Prokey
SIMON & SCHUSTER

Typing Buttor HI	
SOFTWARE ARTS	
TK Solver	
UNISON	
Printmaster	
WARNER SOFTWARE	
MATERIAL SOFT MATE	

Desk Organiser	5
PERSONAL MANAGEM	ENT
CONTINENTAL SOFTWARE Home Accountant Plus	
LIVING VIDEOTEXT	•

LIVING VIDEOTEXT ThinkTank	119.00
MECA Managing Your Money	100.00
MDNOGRAM Collars And Sense	129.00

A	D١	ANTAG	ES	
•	We	welcome	corporate	

<ul> <li>Free technical support.</li> </ul>
· Immediate replacement of
defective goods.
<ul> <li>Bulk discounts.</li> </ul>

## HARDWARE

MUNITUNG	
AMDEK	Our Price
Amdek 310A	159.00
PRINCETON GRAPHICS	
Max 12-E	189.00
HX-12	479.00
SR-12	599.00
Scan Doubler	179.00

PRINTERS	
EPSON FX 80 Plus FX 100 Plus LO 1500	300.00 489.00
NEC 2250	750.00

2250	750.00
OKIDATA All Models	CALL
TOSHIBA	
1340 351	579.00 1315.00
MEMORY AND MULTIFUNCTIO	N BOARDS

JIPUNCTIUN E	IUAHUS
ESEARCH	
k Plus w 64K	255.00
tage w 128K	390,00
plus II w 64K	265.00
A SYSTEMS	
rum	339.00
ULES	

Graphics Card with 0 K	265.0 159.0
M rd 64K	189.0
AS	

HAYES

1200 E 1200

MISCELLAN

	389.0 389.0 679.0
EOUS	
	89.0

MICROSOFT	
Mouse	129.0
Call for prices on IBM o	
and for any item not in	



TERMS: All prices subject to change. No surcharge for VISA or MasterCard. 2% surcharge American Express. No re-turns without RA#. Short shipments

must be notified with 48 hours 15% restocking fee on non-defective goods; \$3.00 C.O.D. charge, Shipping \$4.00 per



# MAKE BETTER DECISIONS **FASTER**



Using this progrom con moke decisions eosier, like word processing mokes typing easier. It's the fastest, mast efficient wov to ensure solid correct decisions. You'll be moking THE RIGHT CHOICE by ordering this pockage and will continue to make many mare right choices ofter using it!

## USE THE RIGHT **CHOICE**

Decision Analysis Program



The progrom is very user friendly. It is menu driven. Almast all options ore shown on the screen. The program is fost. You con enter most choices by just pressing o single keystroke.

The decision is only as good as the information that you put in the program, but the computer is oble to keep track of all the reasons and possible solutions. Stores to 500 solutions and their rotings. This woy, you can refer back if there ore ony questions about your decision or if onother one is needed quickly.



\*All decisions ore thoroughly thought aut. This will impress ca-workers and leave less room for criticism.

\*Yau can make your decisions foster since oll your information ond thoughts are well argonized. This saves your valuable

\*With well documented decisions. you can easily convince others that your decision is correct. \*The progrom Insures that your

decisions are not swayed by emotions or feeling. \*The progrom helps you develop more ideas with its brain-

storming techniques.
\*All the ideas and solutions ore stored an disk where they can be refered to over and over, unlike o piece of poper which

con be lost. \*Your reputation for making THE RIGHT CHOICES will grow and peaple will trust you to do whot is best!

Requires IBM PC, XT, JR. AT, XT or with 128K & com

EARL PUBLISHING

Post Office Box 2537 Galthersburg, MD 20879 301-869-2421 \*

I wont to moke better decisions foster. Enclosed is a check for \$35. Rush me by first closs moil o copy of THE RIGHT CHOICE. If I am not sotisfied I may return the program

١	within two we	eks for o full re	ď
•	Name		
:	Street		
۰			

I State, Zip Code .....

l Outside USA/Conade add SS airmail poetage. Checks m be drawn on a US Bank. Maryland Residents add \$1.75 tax. \*Serry no Credit Cord Orders, COD or Purchase Or-

In a world filled with difficult decisions, moking the wrong one con couse irreversible problems. in business quandories or even personal problems, making THE RIGHT CHOICE is of great importonce. As in ony situation, there is a logical process to follow befare reaching a solution. Often being too involved in the dilemma, it is hard to see what the end result is supposed to be. Now, moking THE RIGHT CHOICE is easy with this Decision Analysis pockage.

The progrom follows a step by step process until there is a clear view of what the best

decision should be. State the problem.

\* List the passible solutions. \* List the conditions the solution

must meet. \* Develop criterio for evolucting the possible solutions.

\* Add Bonus points for negative or positive aspects that haven't

en token into occount \* Decide which possible solutions have best met the criterio.

The program is designed as a free-form progrom so that new ideas or criterio con be added onytime during an evoluction.



by first class mail



### PC: Mart

#### PERFECT COPIES GUARANTEED

Why risk duplicating your important programs on your computer, when our equipment is designed solely to duplicate disks and venty their perfection 100%2

Over 600 formats, 31/5", 51/4" and 8" Plus serialization, copy protection, labeling, packaging, shrink-wrapping and fast, personalized service.



1701 E. Edinger Ave. Building A7 Santa Ana, California 92705 (714) 547-3383 (Collect)

# TERMINAL EMULATION

Softerm PC emulates over 30

- popular terminals including the: • DEC VT102, VT220
- Data General D200, D410
- IBM 3101-20 (block mode) Hewlett-Packard 2622A Honeywell VIP7801, VIP7803

Guaranteed Compatibility Call for free product brief \$195 MC-VISA-COD For the IBM PC/XT/AT, DG1, NEC, Wang PC, TI Pro, Gridcase, Tandy

#### SEIFTRONICS 3639 New Getwell, Suite 10

Memphis, TN 3B118 901-683-6850 CIRCLE 402 ON READER SERVICE CARD

#### System Reset Button

Extendo computer life! 10-moneta matallation on any studel with an soldering Spatem Rayet Butten welske a sempla mystch, does not require removal of any component nor harms the

eg plett it and trag Freet mount models untied behind front panel RRITE Clak software available Dur RRITE Clash holds data in RRITE when retenting from kephoard on PC and RT and other wang zur begboard driver When RRID Dash softmers is used with Reset Purfor on PC. It holds dots under any conditions other than provering off. TT. 41

properties of FC IT 61
frest throne (as) \$24.75:: \$24.95: \$34.95:
button m/mitchare \$59.55: \$44.95:
Front most a 466 \$15.00: \$10.00: \$10.00:
00000: COMMON perials button \$29.95: Mining order casksers check VISA or MC OX is /Comp check 2 srk/clear Pur Grar 6 Grant

Red \$2 50 5/H Cant 6 5% To COD \$3 00 VISB/ITC 3% 165 South ferrego Farkgrag (816) 578 - 056E

#### INTERNAL MODEM \$99

- AUTO ANSWER AUTO-REDIAL · REMOTE CONTROL
- 300-450 BAUD INCLUDES CABLE
   SOPTWARE

best price/performance ratio available. Includes file transfer terminal emulation MODEM, full printer support and remote control. New "modem on a chip" technology increases reliability and reduces power

MBE 1355 Sunnee Ct. Los Aloss, CA 94022 [415] 967-6100

CIRCLE 614 ON READER SERVICE CARD

#### 99 DATABASE LANGUAGE Multiuser/Procedural

- Language
- 17 million records/file
- · Data Dictionary . 10.000 Chr. Record Size
- · BTREE/16 keys per record · Accounting Software Avail

#### CALL NOW 1-800-648-6258

MC & VISA Accepted

**Business Tools Inc.** 4038B 128th Ave. SE #266 Relievue, WA 98006 206-644-2015

CIRCLE 596 ON READER SERVICE CARD

#### 64K • 128K • 256K DRAMS

80287-3

8087-3 8087-2

BITTNER

FLECTRONICS 899 SOUTH COAST HIGHWAY LAGUNA BEACH, CA 92651

(714) 497-6200 CIRCLE 105 ON READER SERVICE CARD

## Computogs Dust Covers



Hand stached natural canvas with brown bind-ing they are far superior to virin at little extra

COMPARE OUR PRICES! IBM PC Combo
IBM PC Keyboard
IBM PC Keyboard
IBM PC Monitor
IBM PC 80 COL Printer
APPLE lie Combo
AT&T Combo-Mono
Epison FX100

OVER 100 OTHER MODELS AVAILABLE— TO PLACE AN ORDER CALL OR WRITE Computogs-P.O. Box 2493 (312) 951,2956

IRCLE 611 ON READER SERVICE CARD

### WANTED:

#### A DATABASE PROGRAM

To run on a PC and/or mainframe to cross match search boolean logic method. For a scientific institution, Must be user friendly. Please contact

FREEPORT MINERALS COMPANY Research and evelopmen P.O. Box 26 Belle Chasse, LA 70037

CIRCLE 593 ON READER SERVICE CARD

#### **ANTI-STATIC TABLE MATS** WARNING

Without anti-static table mats for your computer and equipment you can

> False input & output readings Component Failure Costly repairs

Some circuits in your computer & other equipment operate on 10 voits, some components milivolts, and you can zap them with as much as 35,000 volts penecated from your horly Protect your investment with anti-static

mats in the following sizes. 10(18 \$35.00 Permanent lifetime anti-16(24 \$45.00 static properties mals 24(28 \$55.00 ready to apply on any 24(28 \$55.00 surface Supplied with

Send check or money order to: DOMPROTECH, 1255 Campbell Ave San Jose, CA 95126 (408-241-0499)

CIRCLE 600 ON READER SERVICE CARD

PC MAGAZINE • SEPTEMBER 17, 1985

### PC: Mart

MANY STUDY THE NAME SCANS SECRETTES

. MAXELL BASF . MASHUA Free Cat ction money-back gu \* Cortified 100% over the

. Non-metallic write pretect tal DRATE ACCOUNTS WELCOME

RS: 8 AM - 6 PM Mountain Time Monday-Friday or Order Only: Information & Inc 800 421 8385 Est 148 1-303-758-8133 S&P INTERNATIONAL

8000 E. Evens Ave., Bldg. 2, Suite 315 Degver, CO 80222 CIRCLE 597 ON READER SERVICE CARD

### Cs PROMPT DELIVERY!

	Outside	OKLANO	MA NOS	HES TAX	
6	8067-3	MATH		\$125.00	•
68 I			CESSORS	150.00	
а	1	MANYC	IIC RAM		н.
5.0	256K	256Kx1	120 ns	\$ 4.49	Ιş
备	256K	256Kx1	150 ns	2.95	1 8
ĕ	64K		150 ns	1.10	-
88		EPF	MOR		8
88	27C256	32Kx8	250 ns	\$17.50	- 8
3	27256	32Kx8	250 ns	9 10	Ιē
28	27128	16Kx8	250 ns	3.30	8
5%	27064	8Kx8	200 ns	5.25	Ιě
2	2764	SKVB	250 ns	2.95	9
HS.	2732A	4Kx8	250 ns	2.75	1.3
68		STATI	CRAM		۰
88	62641 P	-15 ac-s	150 ns	\$4.75	

6116I P-3 2K+8 150 ns (918) 267-496

#### PC EXPANSIONS

poerd (64%) uedboard (384k) uedmeg-AT (128k) uadmeg-AT (2M) uadnorf-AT Quadport-AT HERCULES graphics board Color Card with PP HAYES Modems 2400 Smartmodem 1200 Smartmodem 1200B

im Detailfe disks (10) VLM Computer Electronics Park Place • Morristown NJ 079 1267 3268 Visa MC Chick or C

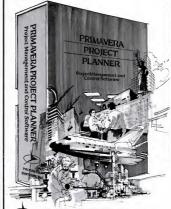
# The power behind

the glory. Primavera Project Planner gives successful project managers the little things they want most out of life...control, control, control. What they like, you'll like...

Our capability for managing projects up to 10,000 activities. Resource leveling and cost management. The ability to compare current schedules to targets and to perform "what-if" analysis. Plus, standard and custom reports to give you the who, what, when, where and why in virtually any format you need.

You can even produce high quality bar charts and network logic diagrams using our optional graphics package, Primavision. Interested? Contact us for more information or the name of a nearby Primavera dealer. Or buy our full-featured demo (handles 60 activities) for just \$75-and put the power at your fingertips.

Primavera Project Planner...the most project management you can get from a micro.





PRIMAVERA SYSTEMS, INC. Suite 925 • Two Bala Plaza Bala Cymwyd, PA 19004 • (215) 667-8600 • Telex: 910 997 0484

# MULTIPLE HARD DISC BACK-UP?

HANDLE IT WITH BACKPACTM!

Back Pac—the totally portable system that combines the

advantages of high speed tape back-up with the flexibility of 10 megabytes of random access storage. Survival™ software gives BackPac the flexibility to either

Survival software gives backers the flexibility to chiner stream data on command, or store and retrieve data on a file by file basis. You can avoid copying bad or non-essential disk sectors—a perfect way to handle archiving, sensitive files, or infrequently used data.

A complete BackPae is smaller than the cartridges other tape back-up systems use, and simply plugs into the external floppy disk expansion port of your IBM PC, XT, or AT\*. There's on each to open your computer (and risk your warranty in the process!) or waste a valuable internal expansion slot.

> At the easy-to-handle price of \$895, Back Pac puts the best features of mainframe tape drives—self-threading, single spool simplicity, a tape transport system that never touches the data surface, and fixed head design—well within your reach.

> > Additional 10 MB tape spools are available at a fraction of the cost of cartridges.

\*AT models require an additional internal board.

IBM PC, XT, and AT are registered undersaries of International Business Machines

More than one PC to handle? Compact, rugged and lightweight, BackPac moves easily from one computer to another, lowering your back-up costs as it goes.



Get a handle on your hard disk back-up needs. Get a BackPac—the leader in totally portable tape back-up systems.

To order your BackPac, call 1-800-252-5255, ext. 823. In Texas, call 1-800-252-9146, ext. 823.



Or write to: BackPac International Corporation 1701 Director Blvd. Suite 250 Austin, Texas 78744 CIRCLE 105 ON READER SERVICE CARD

For information call Scott Richards at 512-448-4965.

#### EDITED BY MARK ZACHMANN



# PC Tutor

Do you have a technical question about your PC? PC Tutor answers both elementary and advanced inquiries.

#### How Many Bytes?

Q: Everyone knows that the DIR command shows you how many bytes are left on your system, but is there any way to get the DIR command to give you a total of the bytes used? This has always been a problem when I want to copy files from one floppy to another. Surely there must be an easier way than getting out a pen or pencil.

Jay Gerhard Boca Raton, Florida

A: The simplest way I know to check for used storage is with the CHKDSK command. If you want to check the disk on drive A:, just enter

#### CHKDSK A:

This will tell you how many files are on the floops and how much room they all take up. Note, however, that this total is not quite the same as the sum of the files' actual byte counts, since each file uses up some multiple of the allocation size. (The FS Ifile size] command in the Norton Utilities returns actual byte counts, and the DIR function of some word processing programssuch as XyWrite II-Plus-does the same thing-Ed.)

#### Sticking to Business

O: I am a regular business user of the PC who likes gadgets, but I am not a proficient programmer. My problem is with the AST MonoGraphPlus graphics card, though it might also apply to the Hercules monochrome graphics card.

While the board does exactly what I bought it for-running graphics on Lotus's 1-2-3-I feel somewhat shortchanged by the fact that I must be an "experienced programmer" (according to the AST manual) to display bit-mapped graphics with Could you explain the limitations of

PC MAGAZINE • SEPTEMBER 17, 1985

such a system (connected to a Princeton Max-I2) for graphics use and possibly write a short program to allow the board to be used for graphics such as games? I am not opposed to typing in a program, but beginning from ground zero to become a programmer is not practical.

Dale L. Chadderdon Tecumseh, Michigan

A: The people at AST are absolutely right about your needing to be a programmer. The monochrome graphics boards (such as Hercules) are almost totally incompatible with the IBM color graphics card.

There is very little you can do about this incompatibility, other than purchasing a different board. Running a game program on the AST would be extremely difficult. Some games would be impossible to convert, while others would look strange (stretched) at best.

Getting a graphics board to work requires two essential pieces. First, you must be able to initialize the board to graphics. With the AST this alone is not such an easy task: it requires sending some 30 values to the 6.845 ports on the board. Second, you must address the bits (pixels) on the board correctly based on its horizontal and vertical resolution. Since the AST has a resolution of 720 × 348 (versus 640 × 200 for the IBM board), you will have trouble getting programs to look right even if you could somehow fool them into initializing the AST.

Finally, most games use the 320 × 200 four-color mode of the IBM color card. This is impossible to emulate with a highresolution monochrome board like the AST. Sorry!

#### DOS Bug Bites

Q: I have been trying for some time to use the ANSLSYS features within GW-BA-



THE MANUAL IS DESIGNED LIKE A POCKET DICTIONARY. THE MAMIAL COVERS ALL THE

PROGRAM'S COMMANDS FUNC. TIONS, AND FEATURES IN ALPHABETICAL ORDER THE MANUAL: IS A COMPACT AND PORTABLE REFERENCE FOR

PEOPLE ON THE GO. GIVE EVERYONE IN YOUR FIRM A

COPY OF THE MANUAL: □LOTUS 1-2-3 □ SYMPHONY □FRAMEWORK □ dBASE II MULTIPLAN WORDSTAR

APPLEWORKS | dBASE III MANAGEMENT INFORMATION SOURCE, INC. 3543 N F Broadway Portland, Oregon 97232

Card No, \_\_\_\_Exp. Date \_\_\_\_ Name \_\_\_\_\_ Address \_\_\_\_ City \_\_\_\_State \_\_\_\_ Zip \_\_\_\_Total \$ \_\_\_\_ Signature\_

☐ Check and Jazz are trademarks of Little Development Corp.
Is a trademark of Astron Time. Addison it is a tradem
Astron-Tale. Affordator is a trademark of Microsov.
Works is a trademark of Agent Gorgues Corp. Multi
Works is a trademark of Agent Gorgues Corp. Multi

☐ MasterCharge

1.800-MANUALS CIRCLE 142 ON READER SERVICE CARD 293

□ VISA

MAMEY



Somewhere in The Sea of Information

At lest! they gasped Softwere for the accessible library! And for only \$79.50! they noted

Ouick Roxanne a check to order by mail' he beseeched

order by mail he beseeched.

I've lost my checkbook
Herschel but I have Vise and
MasterCard!"

Ohiov! Never again will we drown

in the Sea of Information With BIBLIOG2 we will catalog and quickly retrieve information from all our megezines, books, and journels! they joyfully cried then passionately embraced

O MICRO-DYNAMICS OF TEXAS
P.O. Box 40691
Houston, Texas: 77240
Outside Texas: 1-800882-9957
In Texas: 713/896-9957

#### PC TUTOR

SIC on my Sperry PC-20 (monochrome, no graphics). All my attempts have resulted, however, in the display of the ANSI control sequences on the screen. I put DE-VICE=ANSI SYS in the CONFIG SYS command FIROM PT Se[4mSn8g works fine (underlining everything), but the BASIC statement PRINT CHR\$(27)+"[4m" doesn't work.

I have tried the ANSI control codes from within a small assembler program, and they work as described in the manual. Any suggestions? Warichet Raymond

Brussels, Belgium

A: Unfortunately, there is a known incompatibility between using BASIC and AN-SLSYS; essentially BASIC just completely ignores ANSI SYS. This situation occurs because BASIC bypasses the normal DOS screen output and writes directly to the screen instead.

The bug was fixed in DOS 3.0 and above, so your best bet would be to switch to a newer version of DOS. You should note, however, that since GW-BASIC normally contains all of the enhancements that ANSI SYS gives you, it should be easy enough to program BASIC code to do what you need without having to resort to AN-SYS and

#### Stubborn Subdirectories

Q: I have two gnawing problems with which I hope you can help. First, there are two subdirectories on my hard disk that I cannot seem to remove. I keep getting the following error: "Invalid path, not directory, or directory not empty." I've followed all the normal steps to remove the directories, but I still can't get rid of them.

Second, I've installed 640K in my PC-Xry et when I try to format a diskette in either floppy drive, adding the system at the same time, I get a "not enough memory" error. I can format with the B option, then add the system, but if 640K isn't enough to format with the system, what is? Bobby Sundance

Los Angeles, California

A: As for your first problem, the most likeby cause would be files that are marked as
hidden. These will not display when you

try a DIR command, but they will stop you from being able to remove the subdirectory. If the subdirectory previously constained some copy-protected software, this becomes even more likely, since some of those programs work by creating hidden lifes on your hard disk. (The Notton Utilities will permit you to discover and remove any hidden life—Ed.)

Second, you have encountered a comnous, which is custed by having more than 312 K in the system. There are ways to treat this tage (which I also toucked on in terms that they will be the state of the sysstem pleas way is to run something like a servating system (bringing it below \$12K). A similar suproach is to sum off some or, I (temporarily), so the XT see less than ry (temporarily), so the XT see less than a newer version of DOS without that hay (of course this will cost money, since DOS never seems to be swarmateed).

One of our readers, Arthur Bonham of Pleasanton, California, claims that changing his CONFIG.SYS entries from

buffers=20 files=20 to this

to this

buffers=13 files=15

fixed the problem, as well. That seems rather curious to me, but I include it as a possible additional solution,

#### WordStar in a Grown-Up Jr O: I have an IBM PCir with a Racore ex-

pansion box, second disk drive, and 512K.

My copy of WordSur 3.30 runs from a
RAMdisk. I find its ease and speed outstanding. But when I go a step further and try to use ProKey 3.00 to reassign keys to various frequently used words or paragraphs, I run into trouble.

My AUTOEXEC file transfers all Workstor lies to the RAMids. Then, it initiates ProKey and loads my macro. Finally, 1 change to drive C: and nut Wordstor. When I attempt to invoke a ProKey command, however, either my video memory is erased or my overlay files get deleted from drive C:. I often get a "bad file allocation table" message. ProKey works well if WordStar remains on the

#### PC TUTOR

floppy but that defeats the advantage of the RAMdisk. I don't know if it is the Racore RAMdisk software, WordStar, or Pro-Key, and no one at any of the companies seems to know or care.

Mark Perloe Tulsa, Oklahoma

A: I think your RAMdisk software is at fault here. The error messages you have been receiving indicate that the RAMdisk memory area is being overwritten by one of your applications. It is unlikely that this would happen with a properly functioning

RAMdisk program. PC-DOS Version 3.0 comes with a RAMdisk (VDISK.SYS) that I suggest you try. It uses standard DOS conventions and is unlikely to collide with anything else in your system.

#### Toggles in BASIC

Q: Some time ago, you printed a short BA-SIC program that would force CapsLock on. While this has been very helpful, could you please print the pokes and peeks to control the other toggle switches, too?

David Lavin Van Nuys, California

A: This involves a different technique from the assembly language routine I gave in the last issue. Here you peek at the actual area in memory that should hold the switch settings. As an approach, such a technique is not as reliable as the assembly version because some computers may be sugranteed to adhere to the BIOS standard without using memory locations identical to those of the PC. In practice, however, the peeking technique should work on most PC compatibles. The requisite toggle switch values are stored at 40:17 (hex) in

memory. The on	Just	hex	decimal
Insert state		8Ø	128
Caps Lock	:	40	64
Num Lock	:	20	32
Scroll Lock	:	10	16
Alt Key Down	:	8	8
Ctrl Key Down	:	4	4
Left Shift	:	2	2
Right Shift	:	1	1
The following to	wo B	ASIC pr	ograms w
show you how to	mak	e use of t	hese value
For example to	furn i	he Numl	act on

10 REM Turn NumLock On 28 DEF SEG-6h48 38 POKE 6h17, PEEK(6h17) DR 6h26

Similarly, to turn NumLock off

18 REN Turn NumLock Dff 28 DEF SEG-4648 38 PORE shi7, PEEK(shi7) AND NOT sh28

#### The Pace of Progress

O: We recently converted from an IBM PC to an IBM PC-XT. All of our 1-2-3 files were copied to the hard disc "as is," so we've been surprised to find that the cursor now moves around the spreadsheets at a much slower pace. All of our other I-2-3 commands are quicker on the XT (File retrieve/extract, calculate, macros, etc.). It's just the movement around the spread-

sheets and data entry into an individual cell that is slower than it was on the PC. Do you have any idea what is causing this and how we can get the cursor movement on our XT to speed up? We were told

the XT is faster than the PC Martin Kurlander St Louis Missouri

A: The PC and the PC-XT run at exactly the same rate of speed. Disk accesses are quicker on an XT, however, since the hard disk is so much faster than a floppy.

As for your slowdown, I'd bet money that when you switched from the PC to the XT you also switched from a monochrome adapter to a color adapter. Programs must update the display on a color card more slowly than on a monochrome card: otherwise you get objectionable hashing/

snow on the display. You could either switch back to a monochrome display/adapter or get a color board that allows for quick display updating. Two boards I know that can run faster are the IBM Enhanced Graphics Adapter and the Sigma Color 400 board, Getting the EGA to run quicker may be a significant task, however, since many software programs that write directly to the screen check for color versus monochrome and adjust their speed accordingly.

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, PC Magazine. One Park Avenue, New York, NY 10016.

#### XyWrite II Plus.

The fastest word processor available for the IBM PC.

#### SAVES TIME. SAVES MONEY.



Now you can save un to 45 minutes each day by using the word nrocessor designed for office and professional users. Consider this: XvWrite II Plus costs about half as much as some of the most popular word processing packages - it's more than twice as fast - has over 150 features and functions, including three types of split screens with simultaneous

multi-file access, column moves. boilerplate editing, see-what-youprint display, foreign languages, mail merge...And what's more, we have the best user support team available. They're standing by, ready to help. Only \$295.

With the time you save, XyWrite II Plus will pay for itself in three months. Mastercard and Visa accepted. For a demo disk send \$7.00.

XyWrite II Plus. Requires the IBM PC, XTor compatible hardware with 192K memory.
XyQuest = =
P.O. Box 372, Bedford, MA 01730 (617) 275-4439
Please send mecopies of XyWrite II Pluscopies of XyWrite II Plus demo disk
(Add 5% sales tax in Mass.)
Check enclosed MC VISA
Card No
Exp. Date
i
Name
Title
Company



# Index To Advertisers

RS#	Advertisers	Page	RS#
201	Alloy Computer Products Amber Systems	139	198
164	Amber Systems	30-31	226
120	Analytics International Applied Business Technolog	243	221
366	Applied Business Technolog	Y 58-59	106
129			117
	Products Inc.	70-71	
104	Aprotck	218	
110	A S Gibson & Sons, Inc	47	240
101	AST Research. Inc.	52	244
102			130
105	Bac Pac International	292	305
107	Bay Express	258	
103	Beltsofi		235
116	Blaha Software Inc	230	236
147	Borland International	113	123
149	Borland International	111	206
150	Borland International Brightbell Roberts & Co	109	160
112	Brightbill Roberts & Co		209
	Business Computers	205	
128	California Computer & Com	ponent,	247
	Canon Computers & Printers		316
213	Central Point Software	181-182	319
108	Central Point Software	200	177
167	Centronics		177
187	Comark		266
228	Command Technology Corp CompuAdd Corp	346 347	284
110	Computati Corp	. 240-241	162
201	Compucao		119
μb	Compuclassics COMPUMAIL	201	146
136	Computer Accessories	175	145
192	Computer Accessories	1/3	143
181	Computer Control Computer Mail Order	E4.65	143
iŝi	Computer Mart	349	200
175	Connecticut Software	70	143
	Conroy-La Pointe, Inc.	36	143
225	Core International	76	
218	Cosmos	40	163
140	CXI, Inc.	70	243
140	Curtis Marrifacturing	63	227
		259	114

98	David Aldridge Co	. 22
26	Dayna Communications	. 2
21	Decision Resources Deluxe Computer Forms	
.06	Deluxe Computer Forms	5
17	Discount Computer Cetters	20
	Diskette Connection, The	25
	Disk Tech	25
40	Disk World	24
10	Dak World Dak World Dak World	- 25
130	Disk World Dynatech Computer Power Inc. Earls Publishing Eastern Emergines 800 Software Elek Tek Elite Software Supress Systems 120	- 44
KID.	Dynatech Computer Power Inc	-3
35	Earls Publishing	125
36	Eastern Emerprises	110
20	FLATA	100
23	Figures.	- 53
88	Enter Scerware 13	4.17
86	Express systems	- 12
42	Exsys Inc 47st Computer 23	2.23
47		
116		
117		
119	Garden of Eden	300
77	Garden of Eden General Parametrics	16
66	General Technology	5
60	General Technology H&E Computorics	. 34
84	Hammerlab	24
62	Handic Software	13
19	Hauppauge Computer Works	
46	Hercules Computer Technology	12
45	Hammerlab Handic Software Hauppage Computer Works Hencules Computer Technology Hencules Computer Technology Hewkett Packard	- <u>11</u>
43	Hewlett Packard	22
	Hi Tech International	- 15
00	Hi Tech International Hypergraphics Ibes Computer Corp	- 25
43	iber Computer Corp.	1.44
	IBM Business Computer	
163	IBM ISG Division 12	· 16
22	IBM ISG DAVISION	

Page	RS#	Advertisers	Pa
285	113	Lamce	2
2-3	304	LeBaugh Software Corp	
53	282	LeBough Software Corp Logicsoft Lotus Development Corp	. 82-1
.53	166	Lotus Development Corp	74-
207	263	Macola inc Management Information Sou	mer.
257	386	Management Information Sour	ce z
260	216	Magnum PC Mainx Software Technology .	
242	158	Maynard Electronics	
242 268	168	Marriage Executions.	
48	790	MCBS MC-P Applications Micro Computer Accessories Micro Dynamics	- 1
289	314	Mann Consesses Assessmen	
288	320	Micro Departure	- 25
	133	Micro Mart	77.
	332	Microgentals	2/
230		Microrentals. Microrent	56.0
	338	Microston	29
263	326	Microstop	. 13
239	331	MicroWay, Inc. MicroWay, Inc.	Lacres 1
250	159	MicroWay, Inc	
217	208	Minority Hi Tech Industries MLI Microsystems	2
199	340	MLI Microsystems	25
72	185	National Memory Systems NCR Corp	outro
169	165	NCR Corp	220-2,
91	126	Northeastern Software Norton Utilities	0.016
300	346	Norton Utilities	m 112
131	268	Nostradamus Okidata	-10
10	283	63 Oryx Systems, Inc	- 99-
135	351/3	63 Gryx Systems, Inc.	26-
iiš	204	Paradise Systems PC America PC Brand	2
233	311	D. D.	20
145	310	Dr. Brand	240
265	319	PC Brand PC Connection	100.1
244	245		
	179		
127	144		
155	365	Persoft	110000
37	176	Photon Polaris	- P
269	134	Polaris	. 2
254		Potomac Pacific Enumeering	

R I	RS#		P
6345238348614347896867	203		
3	309	Progressive Micro Distributors	
4		Distributors	44.
ŧ١	527	Public Domain Software	- 4
ŧ I	392	Ownerson Software Systems	
ŝ	300/	Public Domain Software Qic Research Quantum Software Systems 301 Qubic 303 Qubic 308 Qubic	. 2
3	302/3	303 Oubić	2
4	307/	108 Qubic	2
8	312/		
۰	154	Rutishauser of America Satellite Software	
àΙ	154	International	
3	321	International	. 2
4		Scitor Corp Server Technology	1
7	124	Server Technology	1
	220 241	Simenon Industries	
2	241	Softline	
8	514		
8	138	Software Bottling	
7		Software Link, Itc	
1969571	393	Software Link, Inc.	
9	173	Software Publishing Sony Information Systems 16	35.
á	135	Spectara Holobate	
9		Spectrum Holobyte	2
8	172	SPSS Inc. Structured Group	1
7	178	Structured Group	
9	156	Statewide Micro Electronics STSC Software	٠.,
í		System Industries Taligrass Technologies I7 Tecmar inc Telasoft see Tel	
9 9	222 501	Talleros Technologies 17	/8-I
*	501	Tecmar Inc	
ź	170	Telasoft see Tel	turi
3	462	Telement 21	a t
8	402	Turner Hall Publishing	~;
5	276	Turner Hall Publishing Turner Hall Publishing	2
7	364		
	1	Warehouse Data Products	
4	202	Xerox AmericaXY Ouest Inc.	
4		AT Questine	4





It's a complete hardware sourcebook with com-
pensons of over 250 of the newest microcomputers
and linkings of over 75 per pherals including disk
drives, moderns, printers, plotters and much, much
more. We provide in-depth evaluations of 23 of the
most popular microcomputers to help you deade
which is the best for you of a price you can offord.
Our 1985 Suyer's Gorde will connect you with the
best values in new corrouter equipment.
ONLY \$3.95
Available at your local newstand

TO

That's exactly what 10 of the world's top 20 CEM's did when they chose to include Centronics printers with their computer systems. And that makes sense, after all Centronics is the one printer company that can offer you a complete product line and then back it up with one of the largest service organizations in the world. Centronics designs printers for every application and we Il work when the contract of the printers of the contract of the contract when the contract is the contract when the contract is the contract when the contract is the contract of the contract when the contract is the contract of the contract when the contract is the contract of the contract contract when the contract contr

**CENTRONICS** 

# BM PC SPECIALS!

IBM PC, 256K, One Half Height 320K Disk Drive DS/DD. Persyst Color Card With Printer Port, Taxan Green Monitor, DOS 2.1, PLUS a 10MB Hard Disk Sub System All For:

\$2599. IBM PC, 256K, Two Half Height

Drives DS/DD, Persyst Color Card

With Printer Port, Taxan Green

Monitor, DOS 2.1, 130 Watt Power

Supply, 10MB Hard Disk Sub



IBM PC, 256K, Two Half Height Drives DS/DD. Persyst Color Card With Printer Port, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply PLUS a 10MB Hard Disk Sub System All For:

\$2899.

IBM PC, 256K, Two Half Height Drives DS/DD, Persyst Color Card With Printer Port, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply, 20MB Hard Disk Sub System All For:

\$3299.

IBM PC, 256K, Two Half Height Drives DS/DD. Persyst Color Card With Printer Port, Taxan Green Monitor, DOS 2.1, 130 Watt Power Supply, 20MB Hard Disk Sub System, PLUS 10MB Tape Back Up System All For:

\$3899. **MULTIFUNCTION BOARDS** 

AST I/O MINI CARD, 1-SER.

System, PLUS 10MB Tape Back \$3499.

Up System All For:

MONITORS	
AMDEK 300 Graen	\$135.
AMDEK 300 Amber	\$149.
AMDEK 310 Amber W/TTL Plug	\$165.
PGS HX-12	\$465.
PGS MAX-12	\$165.
PGS SR-12	\$625.
TAXAN #115 Green Composit	\$125
TAXAN #116 Amber Composit	\$135.
TAXAN #121 Green W/TTL Plug	\$149
TAXAN #122 Amber W/TTL Plug	
TAXAN #425 COLOR MONITOR	\$449
TAXAN #440 COLOR MONITOR	\$569.
IBM MONOCHROME DISPLAY	\$260
IBM COLOR DISPLAY	\$590

TAXAN #121 Green W/TTL Plug	\$149.0
TAXAN #122 Amber W/TTL Plug	\$159.0
TAXAN #425 COLOR MONITOR	\$449.0
TAXAN #440 COLOR MONITOR	
IBM MONOCHROME DISPLAY	
IBM COLOR DISPLAY	\$590.0
PRINTERS	
OKIDATA 182	\$235.0
OKIDATA 192	
OKIDATA 193	\$599.0
OKIDATA 83A	\$555.0
OKIDATA 92P	\$385.0
OKIDATA 93P	
OKIDATA 84P	\$725.0
OKIDATA 235OP	\$1925.0
OKIDATA 2410P	\$1899.0
NEC 3550	\$1550.0
NEC PINWRITER 80 Col.	\$699.0
NEC PINWRITER 130 Col	\$899.0
EPSON LX 80	\$249.0
EPSON FX 80	\$399.0
EPSON FX 100	\$525.0
EPSON RX 100	\$399.0
EPSON JX 80	\$525.0
EPSON LO 1500	\$925.0
COMREX CR 420	\$1895.0
TOSHIBA 351	\$1275.0
STAR MICRONICS SG 10	\$259.0
STAR MICRONICS SG 15	\$395.0
CITIZEN PRINTER MSP-10	\$375.0
CITIZEN PRINTER MSP-15	
CITIZEN PRINTER MSP-20	\$545.0
CITIZEN PRINTER MSP-25	\$740.0
JUKI LQ 6100	\$425.0
JUKI LO 6300	\$745.0
OROTHER HR-25	
BROTHER HR-35	
DYNAX DX 15XL	

\$459.00
\$209.0
\$399.00
\$714.00
\$375.00
\$389.0
\$275.00

DRIVES	
ANDON TM-100-2 DS/DD	\$155.00
OSHIBA SLIMLINE DS/DD	\$139.00
EAC SLIMLINE DS/DD	\$139.00
HARD DISKS	
OMB SUB SYSTEM INTERNAL	\$750.00
EXTERNAL	\$925.00
OMB SUB SYSTEM INTERNAL	\$975.00
EXTERNAL	\$1150.00
OMB SUB SYSTEM INTERNAL	\$1295 00
EXTERNAL	\$1475.00

EXTERNAL	\$1475.00
HARD DISKS & TAPE BAC (EXTERNAL)	K-UP UNITS
10MB HARD DISK	
W/10M8 TAPE BACK UP	\$1250.00
20MB HARD DISK	
W/10MB TAPE BACK UP	\$1475.00
40MB HARD DISK	
W/10MB TAPE BACK UP	\$1795,00

AST SIX PACK 64K, 1-SER., 1-PAR. \_\_ \$265.00 AST PREVIEW \$309.00 AST ADVANTAGE CARD 126K FOR AT \$495.00 ALR CHALLENGER CARD 126K FOR AT \$395.00 PERSYST COLOR PRINTER ADAPTER \$179.00 PERSYST MONOCHROME PRINTER ADAPTER \$199.00 PERSYST BOR CARD \$395.00 HERCIJI ES COLOR PRINTER ADAPTER HERCULES GRAPHIC PRINTER ADAPTER \$325 M

STR GRAPHIC PLUS II \$325.00 IBM COLOR GRAPHIC ADAPTER IBM MONO PRINTER ADAPTER. GENOA SPECTRUM GRAPHIC CARD \$349.00 \$975.00 ORCHID TURBO-186, 128K.... **ORCHID DAUGHTER** TURBO-186, 128K.

MAXELL DISKETTES MD2 MAXELL MD2-HDM FOR AT \$65.00/box CONTROL DATA DISKETTES \_\_ \$30.00/box KEYTRONIC KEYBOARD K0 5151 \_\_\_ \$189.00

Many other products available, Please call for Low. Low Pricesi



(714) 838-7530

2640 Walnut Avenue, Unit K. Tustin, California 92680



#### Graphic Design

The world of business is greatly influenced by design. A well-done presentation can create a great and lasting impression on an audience. Recognizing this, companies and organizations, large and small, consistently shell out big bucks to have the graphics for their annual reports, advertisements, brochures, and presentations professionally rendered.

The upcoming issue of PC Magazine shows you a way to cut down your business's graphic design costs, with in-depth reviews of products that bring professional-quality drawing and graphics to your PC. All give you the essentials; composing, editing, and combining images. Some, however, give you a wide range of exotic features: canabilities range from 4-color palettes and rudimentary design to on-screen three-dimensional perspective and the ability to work with up to 256 separate colors at a time. Some can even hook your PC with a video camera, letting you combine photographic images with computer-generated graphics. We look at six packages, from one that costs under \$100 to one in the \$15,000 range, and ask, program by program, feature by feature, if the programs do what they intend to do and whether they live up to their promises.

#### Grafix Partner

Grafix Partner is a graphics-enhancement package that lets you create free-hand drawings, turn your simple spreadsheet-generated graphs into 16-color, 3-D masterpieces, and even combine drawings and charts together. It's versatile, easy to use, and can reside in the background as a utility to any other program you may be using, so it's always available when you need it.

#### Bibliographic File Managers

A team of professional librarians look into the often-overlooked field of text-oriented data managers. They tell you what is special about this breed of indexing and search tool, which products perform which tasks best, and the price you can expect to pay to get the features you need.

#### Photonet

Photonet, offered through the ITT Dialcom database network, is an on-line service with a visual twist: it's designed to search stock house and photographer's files and help your business or publication find the photos it needs. With over 400 subscribers worldwide, Photonet is well on its way to becoming the prime on-line meeting ground for the photo trade.



Double Sided/ Double Density \$ .89 \$ .85 CALL TOLL FREE

#### 800 USA-FLEX

N ILLINOIS 1-312-351-970



CIRCLE 167 ON READER SERVICE CARD



Symphony

#### SOFTWARE PRICED FOR CORPORATE BUYERS - ALSO AVAILABLE TO END USERS

READY-TO-RUN APPLICATIONS PACKAGES FOR LOTUS® 1-2-3" AND SYMPHONY"

#### THE COMPLETE BUSINESS PA

The Complete Business Pac includes all five essential modules below. Each module is complete, concise and suitable for most small businesses.

- GENERAL LEDGER
- · PAYROLL
- ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE

#### INVENTORY CONTROL The Complete Business Pac . . . . . . . . . . . . \$99.95

STOCK PAC

The Stock Pac provides all major functions for the evaluation, selection and management of investment port folios.

- PORTFOLIO VALUATION
  - BOND CALCULATIONS FUTURE PRICE PROJECTIONS
  - FINANCIAL RATIOS STOCK MARKET ANALYSIS
- CASH MARKET FORECASTING Stock Pac ......\$99.95

PERSONAL/BUSINESS PAC The Personal/Business Pac includes essential functions for a small business or for home and personal use.

- CHECK REGISTER CONTROL TELEPHONE DIRECTORY
- MAILING LIST MANAGER THE BUSINESS/HOME ACCOUNTANT
- CREDIT CARD MANAGER

#### BANK ACCOUNT MANAGER

LOAN APPLICATION PAC The Loan Application Pac figures all interest, mortgage and savings calculations and gives the user professional reports.

- LOAN AMORTIZATION SCHEDULE
- MORTGAGE/REAL ESTATE CALCULATION · CASH FLOW ANALYSIS
- PRESENT/FUTURE PAYMENT. INVESTMENT ANALYSIS
- LEASING Loan Application Pac ......\$99.95

al looking reports.

#### BUDGET ANALYSIS PAC The Budget Analysis Pac is for accountants, investors and small businesses that want to present professional

statements to their clients, stockholders or their investors

- BALANCE SHEET PREPARATION COMPARATIVE INCOME STATEMENTS.
- FINANCIAL RATIOS
- CASH FLOW ANALYSIS

Budget Analysis Pac ......\$99.95

The Depreciation Pac performs all standard IRSaccepted depreciation calculations and prints profession-DEPRECIATION/ACCELERATED COST

RECOVERY SYSTEM

DEPRECIATION PAC

- STRAIGHT LINE DEPRECIATION
- SUM OF THE YEARS DIGITS
  - DOUBLE DECLINING BALANCE

Depreciation Pac ......\$99.95 Each of these Lotus 1-2-3/Symphony add-on packages comes on an protected diskette. The user may modify any add-on package for his own needs. Each package can be used with or without a printer, When used with a printer, the user is provided with professional looking printouts which can be customized to meet the needs of the user. A manual accom-

nanies each nackage. 1-2-3 and Symphony are trademarks of Lotus Development Corp.

[800] 431-2818 [914] 425-1535 Add St to CAMABA or MEXICO

#### CINCLE 216 ON READER SERVICE CARD

PROOUCTS BEYONO THE STATE OF THE ART"

PATRIX SOFTWARE TECHNOLOGY CORPORATION

TO MIKE Street, Boston, MA O2109 (617) 350-8614

☐ Desktop Manager ☐ 128 K Memon ☐ \$295,00

#### IT WILL TURN THE WORLD UPSIDE DOWN





# Pure power.

QIC-60 streaming tape backup is more than just fast and simple to operate. It's also the leader in powerful processing.

For example, our unique five-head tape deck offers immediate read-afterwrite verification. No rewinding necessary. And no rerecording of the entire backup after an error.

Another powerful

advantage is automatic adjustment of the head mechanisms to seek the best track alignment every time a tape is inserted. Plus our exclusive power sensor is designed to allert and freeze the write head if PC power is reduced, which eliminates the chance of disk damage. We're so confident in the technical excellence of GIC-60 that we ofter an aggressive one-year limited warranty on the entire time, compared to the 90-day warranty provided by other manufacturers.

Best of all are a pair of backup bonuses that turn QIC-60 into a sophisticated data management tool. When you select mirror-image restore, QIC-60 sees bad disk sectors and automatically reroutes data to safe locations for improved data reliability. Tecmar offers AT owners a special enhancement with an internally-mounted OIC-80 tape drive that costs even less than external systems. And when you add our internal AT Hard Disk to the package, you have a fully upgraded system ready to use today.

PC MAG

Pure speed. Pure power. Pure innovation from Tecmar.

For a free demonstration of the new standard in tape backup, see your Tecmar dealer or call us at 216/349-1009 for the location of the dealer nearest you.



6225 Cochran Road Solon, Ohio 44139
CIRCLE 501 ON READER SERVICE CARD